

DOCUMENT RESUME

ED 152 299

IB 005 793

AUTHOR Evans, Glyn T.; And Others
TITLE Collection Development Analysis Using OCLC Archival Tapes. Final Report.
INSTITUTION State Univ. of New York, Albany. Univ. Libraries.
SPONS AGENCY Bureau of School Systems (DHEW/OE), Washington, D.C.
Office of Libraries and Learning Resources.
PUB DATE Nov 77
GRANT G007603346
NOTE 69p.; Best copy available, type size small in parts
EDRS PRICE MF-\$0.83 Plus Postage. HC Not Available from EDRS.
DESCRIPTORS Computer Programs; Development; *Library Administration; *Library Automation; *Library Collections; Library Material Selection; *University Libraries
IDENTIFIERS *Ohio College Library Center

ABSTRACT

The purpose of this project is to develop a set of computer programs to perform a variety of collection development analyses on the machine-readable cataloging (MARC) records that are produced as a byproduct of use of the online cataloging subsystem of the Ohio College Library System (OCLC), and made available through the OCLC Distribution Tape Service. To test the programs, a tape of 32,138 OCLC/MARC records representing the combined online cataloging of four academic institutions over a 12-week period beginning January 10, 1977 are analyzed. The results are evaluated by the project advisory group composed of representatives from the four institutions, and the programs are evaluated by a program design consultant. The project demonstrates that valuable and important management information about a library collection development program can be derived from OCLC/MARC records. (Author)

* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *

ED152299

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRO-
DUCED EXACTLY AS RECEIVED FROM
THE PERSON OR ORGANIZATION ORIGIN-
ATING IT. POINTS OF VIEW OR OPINIONS
STATED DO NOT NECESSARILY REPRESENT
OFFICIAL NATIONAL INSTITUTE OF
EDUCATION POSITION OR POLICY.

FINAL REPORT

Project No. 475AH60088
Grant No. G007603346

COLLECTION DEVELOPMENT ANALYSIS USING OCLC ARCHIVAL TAPES

Glyn T. Evans, Project Director
Roger Gifford, Programmer/Analyst
Donald R. Franz, Consultant

State University of New York Central Administration
Office of Library Services
99 Washington Avenue
Albany, New York 12246

November 1977

The activity which is the subject of this report was supported in whole or in part by the U.S. Office of Education, Department of Health, Education, and Welfare. However, the opinions expressed herein do not necessarily reflect the position or policy of the U.S. Office of Education, and no official endorsement by the U.S. Office of Education should be inferred.

U. S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

Office of Education
Office of Libraries and Learning Resources

IR005793

ABSTRACT

The purpose of this project is to develop a set of computer programs to perform a variety of collection development analyses on the machine-readable cataloging (MARC) records that are produced as a byproduct of use of the online cataloging subsystem of the Ohio College Library Center (OCLC), and are made available through the OCLC Distribution Tape Service.

To test the programs, a tape of 32,138 OCLC/MARC records representing the combined online cataloging of four academic institutions over a twelve week period beginning January 10, 1977 are analyzed. The results are evaluated by the project advisory group, composed of representatives from the four institutions, and the programs are evaluated by a program design consultant.

The project is successful. It demonstrates that valuable and important management information about a library collection development program can be derived from OCLC/MARC records.

CONTENTS

	<u>PAGE</u>
Part I Introduction	1
Part II Program Goals	2
Part III History of the Project	6
Part IV Description of Output Reports	10
Part V Evaluation	22
A. Program Evaluation	23
B. Output Reports	29
Part VI Establishment of Tape Analysis Service	33
Part VII Publication of Results	33
Part VIII Conclusion	34
Bibliography	35
Appendices	
1. Project Staff and Advisory Group	36
2. Advisory Group meetings	36
3. Content and Component Analysis Tables	37
4. Sample Reports	47

EXAMPLES AND ILLUSTRATIONS

	<u>PAGE</u>
1. Parsing L.C. Call Numbers	11
2. Analysis of Record Type by Holding Library	13
3. Analysis of Imprint Date by Holding Library	14
4. Analysis of Non-Book Records by Bibliographic Level	15
5. Overlap among Institutions	19
6. Overlap among Holding Libraries in Four Institutions	20
7. Overlap among Holding Libraries in One Institution	21
8. Overlap: Specific OCLC/MARC Records	22

Part I INTRODUCTION

This report is the final report on the Office of Education Library Research and Demonstration project "Collection Development Analysis Using OCLC Archival tapes". The project was funded for Fiscal Year 1976-77 at a level of \$42,415. It was planned to run for one year commencing July 1, 1976. Since there was an unavoidable delay in the commencement, the Office of Education kindly granted an extension of the project for an additional quarter. Thus this report is being produced at the completion of the project on September 30, 1977.

All the work undertaken in connection with the project was performed in SUNY Central Administration in Albany, New York, the agency awarded the grant through the Research Foundation of the State University of New York. The computing facilities used were those of SUNY Central Administration in Albany.

The goal of the project was to write sets of programs which would perform a variety of collection development analyses on the machine-readable cataloging (MARC) records of libraries, retrieved as a byproduct of their use of the cataloging subsystem of the Ohio College Library Center through the OCLC Distribution Tape Service.

The project is successful. It has demonstrated that valuable and important analyses of a library collection development program can be made using the OCLC/MARC tapes. Programs have been written which will perform statistical analyses, a series of disciplinary analyses and overlap (in coverage) analyses of the holdings of one or more libraries or institutions have been developed, and comparisons of relative strengths among and between institutions can be made.

The programs have been written in such a way that maximum flexibility is attainable when performing a range of the same analyses for differing institutions. For example, it is possible to compare the holdings of one library which is a subordinate library in an institution (say, a campus medical library) with other similar libraries (again say, medical libraries) which may be institutions in their own right. Further, even if institutions use different classification systems, it is still possible to compare their relative disciplinary strengths.

The programs are clearly the first step in the resource sharing projects which have been sought, with increasing fervour and despair, by library administrators faced with difficult budgetary situations. There is little chance of cooperative acquisition programs, for example, succeeding when they are not supported by good management data. Furthermore the data offer evidence and information which is of fundamental importance in any sound library management program.

There has always been difficulty in the relationship between the librarian and management information data and there has been some reluctance, it must be admitted, to make the necessary investment in deriving such data. Automated operational procedures are changing this, and there is a slow recognition of the rich resource of management data which lies dormant as a byproduct of such procedures. The OCLC/MARC tapes used in this project, as well as automated circulation, serials and acquisition systems, and automated information retrieval indexing services are sources of untapped management data.

These byproduct data, the programs which analyze them, and the understanding of the resulting reports, are slowly changing the face of librarianship. It is the Project Director's expectation that the data and results derived from this project will be a part of the forces of change. It is for this reason that SUNY Central Administration is planning to establish a tape analysis service for libraries and consortia based on the programs written for this project.

The work begun in this project will not end at its formal completion on September 30, 1977. The tape analysis series will continue for individual libraries and the results derived will accumulate and accrete. Further examination of the data will suggest further analyses which should be made. Hopefully, the basic battery of programs written will support many of these.

There is another tangible mode of continuation. The Principal Investigator and the Office of Library Services has been awarded another O.E. Library Research and Development grant for Fiscal Year 1977-78 for a project "Development of a Responsive Library Acquisitions Formula". Another one-year project, it will use many of the computer programs, particularly the Component Analysis group, developed under this current grant. As in the present grant, all the work will be performed at SUNY Central Administration in Albany, New York.

This report is a chronicle of the project, an outline of the analyses performed and an evaluation of both the computer programs and the analyses, including an assessment of the analyses' utility.

Due to the volume of printed material generated by the analyses, it is not feasible to reproduce them in their entirety in this report. Instead, a representative set of sample reports has been compiled and is available in either hardcopy or microfiche form, at cost, upon request to the Principal Investigator. The contents of the sample set are outlined in Appendix 4.

Acknowledgements

It would not be appropriate to complete one year of exciting but demanding work without acknowledging those who participated in the work. Roger Gifford was the sole programmer employed on the project. He is responsible for all the program design and coding and worked independently following some early consultation regarding overall programming strategy. The programs' range and flexibility and the potential they offer for further analysis and subsequent developments are a tribute to his skills. Don Franz gave invaluable consultative advice and guidance in the overall systems programming strategy, particularly in the beginning phases of the project. OCLC staff and others who had experience handling OCLC/MARC tapes, for example Edwin Brownrigg of NYU, were extremely generous of their time.

The Advisory Group drawn from the four institutions (Cornell, SUNY Binghamton, SUNY Cortland and SUNY Oneonta) worked hard and when called upon, gave sound advice as advisory groups should. The Project is very grateful to the Directors of Libraries of those institutions for both releasing the staff to participate and allowing their OCLC cataloging data to be used as test data in the project. Colleagues in SUNY Central Administration, its computing center, and the SUNY Research Foundation, were consistently helpful.

The final report was prepared for publication by Helene Williams and Maureen Scheely and the report cover was designed by Mike Koen, all three from SUNY Central Administration.

Part II PROJECT GOALS

A. Project Objective

The objective of the project is to develop a series of library material collection analysis reports by discipline and form, based on the machine analysis of OCLC/MARC tapes, in order to provide accurate management data on collection development to librarians and administrators. For the purposes of this narrative, academic libraries are treated as the prime example and target although obviously public, special and school libraries face, to a greater or lesser degree, the same problems, and will benefit from the results of the work.

Faced with increasingly stringent fiscal conditions libraries need the best possible management data in order adequately to allocate their acquisition funds, and in order to relate their collection program with their institutional curricula or research goals. At present, it is exceedingly difficult to monitor the varying rates of collection growth among the different disciplines, and yet such analysis is vital, particularly since the monies spent on acquisition are usually the second largest segment of a library budget.

Underlying the need for management data is the delicate dilemma posed by the relationship between collection development and curricular development, particularly in the creation and maintenance of research collections. To what extent does the program follow the collection, and vice versa? All too often programs are mounted or discontinued without adequate account being taken of the investment in library materials, and the cost of starting or stopping an acquisitions program. Little blame can be attached to any one group for this condition. The absence of sound collection data, and the difficulty of gathering such data, is a major contributory factor to this situation.

It should also be pointed out that the investigators recognize that analysis of current OCLC input does not by any means present the whole collection status of a library, and that it must be supplemented with an analysis of the existing manual shelflist. It is noted, however, that such analyses are common place, and particular attention is drawn to the University of California and Five Associated University Libraries analyses. The programs developed for this project allow a library to define its own breakdown of data into disciplinary categories, and therefore it is possible to use them to supplement and update an existing manual shelflist measurement.

It is further noted that OCLC input may not represent the total library acquisition picture, but, with the growth of OCLC into serials cataloging, and the planned extension into all other MARC-defined media formats, eventually most current acquisition can be analyzed in this way. The one group which presents difficulty is that of non-Roman alphabet material cataloged in the vernacular, but this is such a well defined group of materials and is housed in such few research libraries, that it is felt that its non-inclusion does not present a major disadvantage. Even in this area, OCLC is making progress towards a solution.

The important and overriding need is to provide a mechanism which will allow an institution to measure the impact of its day to day library acquisition decisions on its total collection program. This project will develop a mechanism which will enable it to do so, through the simple and relatively easy means of acquiring a tape, or series of tapes, and submitting it for analysis. The cost of such a procedure, when measured against the dollars invested in both acquisitions and academic programs, is relatively small, and should be considered a valuable insurance against poor initial dollar investment.

Three levels of complexity of the problem can be readily discussed.

The first level is the institution with one library serving all its institution's needs, for example, a small to medium sized college campus. Here, the librarian and campus administration need to relate the total campus library needs to the current and planned curriculum. This problem may be complicated by the need to build intermediate level research collections to support Masters - level programs. In addition, the campus may have a system of acquisition allocation to academic departments, which can also be well monitored using this program.

The second level of complexity is the single institution which maintains more than one library on its campus, which may or may not have a central purchasing and processing facility. In this case not only are the usual campus problems above encountered, but the question of overlap among collections is addressed.

The final level is a group or set of institutions, which may or may not contain smaller branch libraries. Here, the question of overlap is important within discipline, but the overriding concern is the rank order of the various disciplinary strengths as they are developing. This data is of paramount importance in planning academic programs among a group of institutions, or in planning cooperative acquisition programs.

A number of sets of institutions can be defined, for example:-

Campuses within a multi-campus system selected either by type (e.g. University Centers, Colleges of Arts and Science) or by geographic Location (e.g. SUNY Planning Regions).

Libraries in adjacent geographic areas, whether or not they are in the same multi-campus system.

Collections with a disciplinary commonality, e.g. medical libraries or music libraries, which may or may not be free standing institutions.

It is the latter level, i.e., the relative disciplinary strengths in a number of different campuses, which has been the preoccupation with the University of California and FAUL studies mentioned above.

The important point is that a well defined set of computer programs can satisfy the needs of all the above types or sets of libraries.

Finally, one of the expressed advantages in participation in the OCLC system is the opportunity to take advantage of coordinated collection development programs with other institutions or campuses. This advantage is often expressed without any regard to the complexity, both technical and social, of the problem. Yet libraries' acquisition budgets are being severely curtailed and, in the absence of sound data, many wrong decisions will be made in the immediate future. It is the intent of this project to provide some minimal management data to assist in informed decision making, and move collaborative acquisitions and program development from pious hope to operational reality.

B. Project Approach

1. Data Acquisition

OCLC makes available for purchase by participating libraries OCLC/MARC tapes containing all records used for cataloging purposes. A tape is a strictly chronological sequence of records used in the course of a library's cataloging work with the system and is available to record a period of time defined by the participating library. An OCLC publication, OCLC-MARC Subscription Documentation (December 1976), provides the definitive specification for OCLC/MARC tape records.

The ability to produce the requisite reports is based on the development of statistically manipulable tapes derived from data elements drawn from the OCLC output tapes. e.g.:-

<u>Data Element Name</u>	<u>Tag</u>	<u>Subfield</u>
Type of record (e.g. language materials, music)	Leader	
OCLC Record #	001	
LC Call #	050	\$a
Dewey Call #	082	\$a
NLM Call #	060	\$a
Local LC Call #	090	\$a
Holding library code	049	\$a

(N.B. the dollar sign is used to represent a subfield delimiter).

The four letter library and institutional ID code will be drawn from the records. In the case of the members of a set of institutional libraries, a merged tape will be created by selection from the individual library tapes prior to the performance of the statistical analysis segment of the program.

2. Definition of Class Structures for Analysis

Given that the data elements can be extracted, the most significant task to be undertaken by the library or libraries desiring tape analysis is the definition of the classes to be analyzed. A set of tables into which a library can enter its own class structures is created for the following elements:-

Holding library code
Call number (e.g. L.C., Dewey, NLM, local)

The four character holding library code is found in the holdings (049) field of the OCLC/MARC record. The first three characters are unique to an institution. The fourth character defines holding libraries within an institution. Institutions with many holding libraries may have more than one three character prefix assigned. For example, Cornell has holding library codes beginning with COO and XO0. The tables must be totally flexible such that a group of libraries can be defined as:-

All of the holding libraries at one institution

Example: Cornell defined as COO + XOO.

A set of individual holding libraries within one institution.

Examples: 1. SUNY Stony Brook Main Library defined as YSMM.

2. Stony Brook Chemistry, Engineering, and Earth and Space Sciences defined as YSMC + YSME + YSMG.

3. Stony Brook Art, Music, and Scores defined as YSMN + YSMA + YSMJ.

A set of institutions.

Example: SUNY at Brockport, Cortland, Fredonia, and Geneseo defined as XBM + YCM + XPM + YGM.

A set of department-level and institution-level libraries having similar collections.

Example: A group of law libraries, such as Albany Law School Library and Yeshiva University School of Law defined as YZA (total institution) + YYPC (departmental library)

The holding library code table will allow departments on a campus, libraries in consortia, or having geographic proximity, or belonging to the same administrative unit (e.g. public libraries in a system or campuses in a multi-university, or libraries sharing a disciplinary commonality), to relate their holdings and growth patterns one to the other.

The appropriate call number field is used such that:-

Records in one unique call number (e.g. AE Encyclopedias) are grouped together as a class.

Records falling within a range of call numbers (e.g. GV 1-198 Recreation) fall together as a class.

Combinations of these may be grouped together as a class.

The call number table allows a library or set of libraries to define its own breakdown of the class system, although in practice this may be discouraged since at least four divisions of the classification system have been or are commonly being used for shelflist collection analysis or other purposes:-

University of California shelflist analysis. A careful breakdown of L.C. class into some 600 subdivisions. Also used by FAUL in its recent shelflist study.

Columbia University shelflist study. A breakdown of L.C. class into some 1400 subdivisions, used by Columbia University in 1971 for shelf estimation purposes and currently being used by METRO (N.Y. City Consortium) on an experimental basis to assess strengths of various member libraries.

FAUL Joint Acquisition policy studies. 1961. Analysis of L.C. system devised primarily by Felix Reichmann (Cornell) for collection strength assessment.

SUNY Open Access system statistics. A gross (31 division) grouping of L.C. call numbers used to measure direct borrowing among SUNY campuses.

Other subdivisions, at least of the L.C. class, should be discouraged simply because of the virtues and advantages of consistency to be gained from accepting an established analysis, and to avoid additional operational expense which may not, in fact, yield any significant operational benefits.

Two types of analysis are identified, Content Analysis and Component Analysis.

2a. Content Analysis

This is an assessment of a collection which follows the divisions of the classification scheme. Each title is assigned to one place and one place only according to its call number. Analysis may be limited to a specific subcollection such as Science, and the depth of analysis may vary from one part of the collection to another. Manual shelflist measurements may be added to counts from OCLC/MARC tapes to measure change in a collection. The studies listed above are examples of this type of analysis.

To demonstrate Content Analysis in this report, the University of California Shelflist division (2) is used. It has been adopted, without summary classes, as a standard for collection development analysis by the Resources and Technical Services Division of the American Library Association (1).

2b. Component Analysis

This is an assessment of the components of a library collection which support a particular discipline. A "discipline" may be an academic program, a department, or simply a set of related subjects. A discipline is defined as follows:-

- a. it is composed of discrete segments of the classification scheme.
- b. the segments may be drawn from any part of the classification scheme; they need not be contiguous.
- c. the total library collection need not be the sum of all defined disciplines.

- d. a discipline may be defined as a hierarchy which represents different subjects or facets of the discipline at various levels.
- e. disciplines may overlap at any level.

To demonstrate Component Analysis, five disciplines defined by the Advisory Group are used:-

Anthropology
Linguistics
Geology/Earth Science
Industrial Arts
American Philosophy and Religion (American Studies)

The A.L.A. R.T.S.D. division of LC classification schedules used for Content Analysis, and the discipline definitions used for Component Analysis, are shown in Appendix 3.

3. Overlap Analysis

The next significant segment of the program is the overlap study based on the fact that each record has, as a common element, the unique OCLC record number. It is felt that it would be useful, in the studies of sets of libraries, to give some indication of the commonality or uniqueness of collections based on the use of the same OCLC unique record by a set of libraries.

The overlap report provides the following statistics within any grouping of class numbers or libraries:-

- % and # of records held by all libraries,
- % and # of records held by all libraries minus 1
- % and # of records held by all libraries minus 2
- % and # of records held by one library only.

In addition bibliographic data may be listed of records held in common by a specific number or set of libraries.

It should be noted at this point that the principles established in the overlap study can be carried much further, provided additional data elements are selected from the OCLC/MARC tape. For example, an overlap analysis by language code or government code or country of publication code may prove valuable in special and unique circumstances.

4. Reports

All the above elements and tables are combined to produce a series of reports:

Report 1.

Analysis of holdings by class for one library, showing class division, number of records, percent of total, and rank order of discipline strengths in the library.

Report 2.

Analysis of holdings by class for a set of departmental libraries within an institution, showing class division, number of records, percent of total, rank order of discipline strengths within departmental libraries, and rank order of discipline strengths in the institution.

Report 3.

Analysis of holdings by class for a set of libraries having comparable collections (e.g. medical libraries) showing class division, number of records, percent of total, rank order of discipline strength within each library, and rank order of discipline strength among all of the libraries.

Report 4.

Overlap study of the use of the same OCLC/MARC records by libraries in a set, and rank order list of libraries with the most unique or most common records by subcategories.

A supplementary report to Report 4 lists the records held by only one library, or the records held by all libraries, and shows their location and distribution.

Report 5.

Summary statistical report series giving numbers and percents of records by type of record, form of reproduction, imprint date, language, country of publication (and expandable to virtually any data element in the OCLC/MARC record) within each library and overall.

Part III HISTORY OF THE PROJECT

A. Chronology

The Advisory Group met on September 12, 1977 in Albany, N.Y. Representatives from the four advisory institutions whose data were to be used for testing (SUNY Binghamton, Cornell, SUNY Cortland, and SUNY Oneonta) were present. The meeting served to acquaint everyone with the goals and strategy of the project. Discussion included which data elements from the OCLC/MARC records should be used in the analysis, and online cataloging conventions of the individual institutions. Of particular importance was the 049 (holdings) field, which contains the four character code of the holding libraries, the number of copies, and the number of volumes of a particular title. It was determined that the numbers of copies and volumes were not always input, and in any event would be difficult to interpret, so analysis should be limited to counting titles. However, the programs should be designed to count copies, volumes, and even cost of acquisition when such data becomes available.

Roger Gifford, the Programmer/Analyst, took up his appointment in mid October. He visited OCLC, regarding the problems of programming to handle the OCLC tapes. The program to "crack" and edit the output tapes for monographs was written, based on an earlier extant program in SUNY. This first step was the essential precursor to identifying and extracting specific fields and codes for subsequent analysis. The next stage of this work was to expand the programs to handle all MARC formats, e.g. A.V., music scores, maps, etc., since there are some significant structural changes with these other formats.

Don Franz, the program design consultant, came to Albany for two or three days early in December and the entire set of programs, and their interrelationships, were designed in sketch form.

A letter was sent to OCLC requesting the tapes for the test period. A combined tape containing all the cataloging input for a period of 12 weeks commencing January 10, 1977 for the Advisory Libraries was supplied by OCLC in mid-April. The cost was \$244 for 32,138 records.

In January, 1977, Roger Gifford met with Cornell librarians to discuss handling of call number fields. Cornell's Law library uses the 099 (free format call number) field to catalog law titles according to the U.C.L.A. Law Classification. Other special collections are cataloged using non-standard L.C. numbers in the 099 and 090 (locally assigned L.C. call number) fields. The librarians emphasized how important it was that the programs be able to handle this field.

The second meeting of the Advisory Group was on May 17, 1977 at SUNY Cortland. Preliminary analyses of the first 4,000 records of the OCLC/MARC test period tape were presented. Included were summary analyses within holding library of the numbers and percents of titles by type of record, bibliographic level, type of cataloging transaction (produce catalog cards, update OCLC record, etc.), and imprint date range. In addition, the L.C. call number fields were listed by holding library. It was decided for the final report that the 099 field should be excluded because of problems in identifying non-standard L.C. call numbers. This did not, however, preclude the use of the programs to provide additional analyses of the 099 field.

In the last four months of the project, the Advisory Group defined the disciplines for Component Analyses (see Part IV.B.4 and Appendix 3 for their definitions). These were keypunched and checked for validity. One of the structural rules is that the most elementary classes of bibliographic records may not overlap. This ensures that higher level classes, which may overlap and are formed by merging lower level classes together, do not include the same bibliographic record twice. Ensuring that the definitions met this criterion was a time consuming editing process.

The first major production run was the EXTRACT run of the entire tape of 32,138 records. It was executed in a series of runs during August 22-25 and took a total of two and one half hours of computer time to accomplish. The amount of time expended was due, in part to the wish to include as many elements as may be needed to test and demonstrate the final analysis and report programs fully. However, only half of the data elements extracted were actually used. The expectation is that not extracting the unused data elements would reduce the process time needed, and hence the cost, by about half.

Subsequent report-generating runs required much less machine time because they operated on a smaller, simpler record.

The entire set of programs were mailed to the consultant for critical review and analysis. (See Part V.B)

The final Advisory Group meeting was on September 12 at SUNY Cortland. Examples of all reports were distributed to participant members, although not all the production runs planned were completed by that date. The remaining reports were distributed to the group following the meeting.

The remainder of the grant period was spent in completing program documentation, in preparing the final report, and arranging for its production and distribution.

B. Analysis Phase

Most of the effort of the project was directed toward the development of a set of computer programs. The following sections describe this development through the analysis, design, and implementation stages.

The first step was to identify the basic requirements of collection development analysis. Since the development of computer software is expensive, and since the programs developed would hopefully be in use for some time, the overriding consideration was flexibility.

With respect to input data, the programs should be able to:-

1. extract for analysis any field, subfield, or set of fields and subfields in the OCLC/MARC record.
2. input other types of data, such as shelflist measurements, faculty and student data, and book publishing statistics.

With respect to analysis:-

1. any classification notation (e.g. L.C., Dewey, NLM, NAL) may be used.
2. analyses should accurately reflect the disciplinary breakdown of the collection with which the user must work. Specifically, the breakdown of a discipline into multiple levels of subject areas or facets which may overlap must be addressed.
3. analyses should allow the comparison of collection strength among libraries, and reflect the organization of libraries as seen by the user.
4. libraries using different classification notation may be compared to each other, provided that a common set of subject classes is agreed upon, and translation from each notation to the classes in the set is defined.
5. other data elements, such as language, imprint date, or any other OCLC/MARC field or subfield may be analyzed.

To achieve these requirements, several decisions were made relating to program development.

The first was the choice of a programming language. A high-level language is generally desirable because coding is faster, the programs are easier to modify and maintain, and they can be more easily adapted for use on other computers. COBOL and PL/I were considered. The main points in favor of COBOL were that it is considered to be more efficient than PL/I, it is available on more computers, and more programmers know COBOL than PL/I. The main point in favor of PL/I was that it has string operators which can be used to extract the fields of an OCLC/MARC record, which vary in position and length from one record to the next. PL/I also has facilities for more types of data structures than COBOL, such as bit strings and linked lists which can be used to represent the hierarchical and overlapping relationships among components of a library collection more easily than using arrays in COBOL. PL/I language syntax allows programs to be coded more generally and to be more easily modified than COBOL programs. In the end, PL/I was chosen because the extract program could be more easily be written in that language, because it was desirable to code all of the programs in the same language, and because flexibility and modifiability were seen as paramount in this project. Having finished the project, the staff are convinced that the programs could not have been finished in one year had COBOL been chosen, but the staff are also certain that the efficiency of the PL/I programs could be greatly improved. However, optimization of the programs should wait until the analyses they generate are refined and shown to be satisfactory and useful.

Another decision relating to program development was to use existing software when significant effort would be required to program the same capabilities, and when versions of the software were available on other computers.

This decision was applied in the area of statistical analysis by using the Statistical Package for the Social Sciences (SPSS) to do crosstabulations (4,5). SPSS is a package which is available on many different computers, and is constantly maintained and enhanced. It was chosen over other statistical packages because it was the only one available on the SUNY Central Administration computer. It is an extremely powerful and flexible package which is also reasonably efficient. Its use for this project is described in more detail in IV.B.

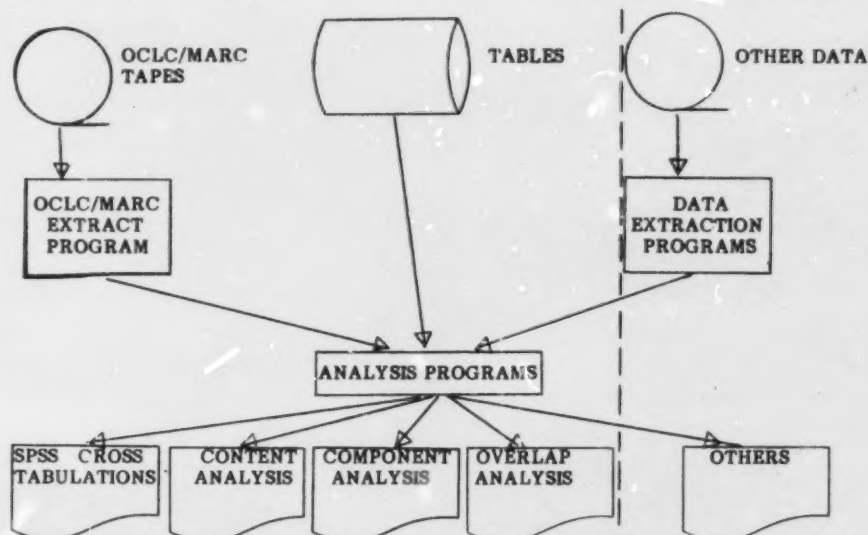
The other major piece of existing software that was used in the SELECT Utility. This is a utility for selecting and reformatting data records, for which selection criteria are input as symbolic logical expressions. While this particular program is not available on computers other than SUNY Central Administration's, most computer manufacturers provide a set of basic utilities with which the same types of things can be done.

The need to analyze a collection according to any disciplinary breakdown, and for any organization of libraries brought about another major decision. Any structure of disciplines or libraries is represented as a hierarchy, and the hierarchy is stored as a set of tables separate from the programs. By specifying to the programs which set to use, specific analyses can be produced.

The realization that a discipline, the divisions of a classification scheme, and a set of libraries could all be represented using the same model, the hierarchy, was a major milestone in the project. Since the counting of titles by discipline component or class could be handled by the same programs which counted titles by library, fewer programs had to be written and the resulting programs could handle any hierarchical structure.

C. Design Phase

As a result of the decisions made during the analysis phase, the following basic design for the system was adopted:-



Everything to the left of the vertical dashed line is the system which has been implemented; everything to the right shows how it might be expanded.

The primary source of input to the system is, of course, the OCLC/MARC tapes. The OCLC/MARC EXTRACT program contains all of the logic necessary to extract specific data elements from the tapes. As other sources of data are added to the system, extract programs for each of them might be added as well.

The analysis programs themselves are data-independent. This means that the same programs can be used to analyze virtually any data element. This is achieved by describing each data element by parameters as to the number of characters it contains, its position in the input record, and its role in the processing.

Each of the analysis programs satisfies all requirements in the system for a certain type of processing. For example, the PARSING program performs all data transformation, and can therefore be used for such diverse tasks as reformatting L.C. and Dewey call numbers, isolating words within a subject heading and removing punctuation from an author or title field. Content, Component, Overlap and other types of analysis are all produced by using these same programs in different combinations.

Another part of the system is a file of tables. As explained in III.B, the organization of components within a discipline, of divisions in a Content Analysis, and of libraries in a set of libraries can be represented as a hierarchy and stored as a set of tables:-

1. the labels table contains the text which is used as the name of each class in the hierarchy. A class corresponds to a component, division, library, or a grouping of these depending on the type of analysis.
2. the relations table shows how the classes are related. If one were to draw a hierarchy to represent a discipline, for example, lines would be drawn from each component to the subcomponents below it of which it is composed. Each line would be one entry in the relations table.
3. the ranges table gives the ranges of data values that are assigned to each class at the bottom of the hierarchy. To ensure that each title can be placed in only one class, none of the ranges in the table can overlap. For disciplinary analysis, this table would contain ranges of call numbers. For grouping holding libraries together, this table would contain holding library codes.

There are other types of tables as well. For example, a parse table defines the reformatting of a data element to enable comparison and sorting by computer. The parse table for L.C. call numbers is shown in IV.B.

D. Implementation Phase

A total of eight programs were implemented.

1. Extract

This program extracts fields, subfields, portions of fields or subfields, or combinations of these from OCLC/MARC records.

2. Parsing

This program handles virtually any classification notation such as L.C. and Dewey call numbers. It transforms data into a standard form which may be readily sorted and compared by computer.

3. Partition

This program assigns input records to the elementary classes of hierarchy. It satisfies several requirements of collection analysis:-

- a. A component of a discipline may be defined as a set of call number ranges from all parts of the classification schedule.
- b. the collections of any set of holding libraries or institutions may be treated as a single collection.
- c. it ensures accountability by assigning each selected title to only one elementary class.

4. Classify

This program combines the elementary classes of a hierarchy to form the higher level classes in the hierarchy.

It is this program which reorganizes data into the disciplinary breakdown, or grouping of libraries, defined for a particular analysis. Higher level classes generally correspond to larger ranges of call numbers in Content Analysis, more general subjects or aspects of a discipline in Component Analysis, and groupings of libraries convenient for the comparison of collections.

This program works in such a way that detailed information such as title and author can be carried along, so that listings of detailed information can be produced for each discipline component, call number range, or group of libraries.

5. Aggregate

This program counts the number of titles in each of the classes formed by the CLASSIFY and PARTITION programs. It also computes percents within each class and overall.

6. Rank

This program ranks classes according to the numbers of titles they hold. Ranks are assigned to subclasses within a class and to classes overall. Classes with equal numbers of titles may be assigned equal ranks, ranks in ascending sequence, or ranks equal to one plus the number of classes with more (or fewer) titles.

7. Report

This program generates both detail and summary reports by institutional and disciplinary class. A report may list any of the original input data elements, or any of the statistics generated by RANK and AGGREGATE.

8. Select

This program creates an OCLC/MARC tape containing a subset of the records from the original OCLC/MARC tape. The records are selected on the basis of their relative position on the original tape.

This program was added when it was realized that during an analysis of OCLC/MARC records, it would often be useful to perform subanalyses on subsets of the records satisfying certain criteria, and that this might mean going back to the original OCLC/MARC tape and extracting additional information relevant only to that subanalysis.

Part IV DESCRIPTION OF OUTPUT REPORTS

A. Criteria for Selection of Records for Analysis

1. Data Extraction

The first step was to extract the data elements from the 32,138 OCLC/MARC records acquired for analysis. A total of 34,034 extract records were generated. More records were generated than input because some of the records contained more than one holding library code in the 049 (holdings) field. In such cases, the EXTRACT program generates an extract record for each holding library code. The set of data elements extracted and the maximum number of characters ("length") accepted for each are as follows. A dollar sign (\$) is used to denote a subfield:-

<u>Mnemonic</u>	<u>Length</u>	<u>Data Element</u>
FOCN	7	OCLC record number
LLDR	24	leader
P008	40	008 field
VHLC	4	holding library code
VLC	20	selected L.C. call number
SCON	14	(reserved for parsed L.C. call number)
V050 1A	20	L.C. assigned L.C. call number (050 field \$a subfield)
V050 1B	10	L.C. assigned Cutter number (050 field \$b subfield)
V090 1A	20	locally assigned L.C. call number (090 field \$a subfield)
V090 1B	10	locally assigned Cutter number (090 field \$b subfield)
V099 1A	20	free format call number (099 field, \$a subfield)
V099 1B	10	free format Cutter number (099 field, \$b subfield)
SEQ	8	sequence of the OCLC/MARC record on the tape

The analyses actually performed used only the first six and the last data elements. Eliminating the others would have reduced the computer time required for extraction by about half.

The criteria used to choose the selected L.C. call number was:

if the locally assigned L.C. call number (090 field, \$a subfield) was present in the record, use it.

otherwise, if the L.C. assigned L.C. call number (050 field \$a subfield) was present, use it.

The free text call number (099) field was extracted separately for these analyses but as noted above, it was not used. However, the call number selection facility is flexible enough to include the free text call number in the selection algorithm for other analyses if needed.

2. Parsing L.C. Call Numbers

The next step was to "parse" the selected L.C. call number. The function of the PARSE program is to take the call number selected by the library for use and standardize its notation in order to allow its subsequent comparison with others in the same notation.

The routine is totally generalizable to handle any classification notation. It is controlled by a table which defines the different structural elements within a call number and indicates how each element is to be incorporated in the standard notation.

Each element is described in terms of the set of characters it can contain (e.g. only letters or only digits), the maximum number of characters, and what to do if fewer than this number are actually found (e.g. for letters, "left justify" and leave the remaining positions blank; for digits to the left of a decimal point, "right justify" and fill the remaining positions with zeroes).

Operationally, it was found necessary to incorporate edit functions on the incoming call number, for example to eliminate extraneous blanks. The example that follows does not demonstrate this capability.

<u>Parsing Stage</u>	1	2	3	4	5
1. Maximum number of characters	4	4	1	1	4
2. Character set	A - Z	0 - 9	.	A - Z	0 - 9
3. Fill character	(space)	0	.	(space)	0
4. Justify	left	right	n/a	n/a	left

Input to Parsing

'M2'	'M	'	'0002'		
'LA1151'	'LA	'	'1151'		
'QA135.5'	'QA	'	'0135'	'.'	'5'
'PQ2309.H4'	'PQ	'	'2309'	'.'	'H' '4'

Intermediate Results

Final Result

'M 0002'
'LA 1151'
'QA 0135.5'
'PQ 2309.H4'

Example 1 - Parsing L.C. Call Numbers

3. Selection of Extracted Information

Having parsed the L.C. call number into a standard format, the next step was to eliminate records of titles not to be included in the analyses.

The computer programs used for the selection of data were: -

the IBM SORT/MERGE Utility.

the SUNY Central Administration Computer Center SELECT Utility.

The latter, written by Mr. S. Kurt Shiftner, an Associate in the Office of Institutional Research and Analytical Studies of SUNY Central Administration, is a very powerful utility for selecting and reformatting data records. Selection criteria are input as symbolic logical expressions. This utility is not the same as the SELECT program described in section III.D.

Of the 34,034 extract records, a total of 8,412 were eliminated giving a net total of 25,622 records. The selection criteria used are as follows:

3a. Transaction type

<u>Type</u>	<u>Number</u>	
produce records	28,617	selected
all produce records	0	selected
replace records	2,132	selected
update records	3,219	eliminated
cancel records	66	eliminated

Records eliminated 3,285

3b. The latest use of an OCLC data base record for each holding library

There were 25,999 unique OCLC data base records that appeared on the tape. The fact that 28,220 records were selected reflects the use of some OCLC data base records by more than one holding library.

Records eliminated 2,529

3c. Valid L.C. call numbers

These are strings of characters in the L.C. call number fields which do not conform to the L.C. Classification Schedules. They are normally the result of local or OCLC-defined cataloging conventions. These are considered invalid LC call numbers and were eliminated.

i. X

A convention of OCLC catalog card production is that if the L.C. call number field contains X, the L.C. call number will be taken from the free format call number field (099 field, \$a subfields). 1,732 records of this type were found.

ii. PAMP, FILM, MICR, CORN, REC, THES

These are values that appear in the L.C. call number fields of some special collections (e.g. pamphlets, films, Cornelliana etc.) at Cornell. Only one title was found, although 21 were present, because they were input in both upper and lower case while only records with all upper case characters were eliminated. Due to the number of records involved, however, the error introduced is insignificant.

iii. LAW

Cornell's Law Library catalogs law titles according to the Los Angeles County Law Library Classification scheme, LAW is entered in the L.C. call number field and the actual call number in the free format (099) field. 101 records of this type were found.

3d. SUNY Oneonta Children's Collection

The campus school of the SUNY College at Oneonta closed and gave the library about 40,000 titles. They are identified by the intellectual level code for juvenile works (J) and the institution code for Oneonta (ZBM). 921 records of this type were found.

3e. SUNY Oneonta Retrospective Cataloging

Oneonta was retrospectively cataloging some special collections which were identifiable by holding library codes ZBMA, ZBMT, and ZBMN. Due to a typing error, the records for holding library code ZBMN were not eliminated. The error was again insignificant, however, since only 18 records, or 0.4% of Oneonta's records for the tape were from the ZBMN collection. 38 records with holding library codes ZBMA and ZBMT were found.

Records eliminated (3c, 3d, 3e) 2,598

The numbers of records eliminated in each step 3c, 3d, and 3e are not given separately because some records were eliminated in more than one step.

This elaborate selection process demonstrates the flexibility of the computer programs, but also shows the importance of understanding the cataloging practices of different institutions and even of different holding libraries in the same institution.

B. Generation of reports

Having described the preparation of the data, we now describe the reports which analyzed them.

1. Statistical Summary Reports

One of the basic requirements for the fulfillment of the project was the development of a "statistical summary report series". After some examination, it was recognized that the best way to develop this particular series was to use the program package Statistical Package for the Social Sciences (SPSS) (4,5). The advantages of this decision were that it saved a considerable amount of original programming effort, better dedicated to writing the analysis programs not available elsewhere.

SPSS is a powerful statistical package providing data selection, sampling, transformation, and analysis capabilities. Simple analyses provide counts, frequencies, averages, histograms and crosstabulations. More complex analyses provide correlations, regressions, analyses of variance and factor analyses. The only feature used in these reports was crosstabulation, but the availability of the other types of analyses is a further point in favor of using it.

When used in tandem with the programs developed during this project, SPSS is especially valuable. It can be used to reduce thousands of records of detailed information to a few tables of relevant summary statistics which can then be used to pinpoint sets of records to be studied in detail using the project-built programs. This was done in the Overlap Analyses, described in section IV.B.4.

The reason for choosing SPSS instead of other statistical packages is that it is the only package available at the SUNY Central Administration Computer Center. Any statistical package with the same capabilities could have been used. The other analysis programs developed for the project were designed with no dependencies upon SPSS.

The SPSS crosstabulation report format is explained in the following example:-

*****CROSSTABULATION OF*****

LTOR	TYPE OF RECORD		BY VHLC		HOLDING LIBRARY CODE	

LTOR	VHLC						ROW TOTAL
	COUNT	I					
	ROW PCT	I					
	COL PCT	I					
	TOT PCT	I	YOMR	I	YOMM	I	
	I	I	I	I	I	I	
C	I	I	0	I	21	I	21
music scores,	I	I	0.0	I	100.0	I	0.5
printed	I	I	0.0	I	0.6	I	
	I	I	0.0	I	0.5	I	
	I	I	I	I	I	I	
A	I	I	211	I	3677	I	3888
language	I	I	5.4	I	94.6	I	99.5
material,	I	I	100.0	I	99.4	I	
printed	I	I	5.4	I	94.1	I	
	I	I	I	I	I	I	
	COLUMN		211		3698		3909
	TOTAL		5.4		94.6		100.0

YOMR - SUNY Oswego reference Library

YOMM - SUNY Oswego main library

Definition of Terms

1. COUNT - the number of records satisfying both the row and column conditions.

2. ROW PCT - the percent of the total for the row.

3. COL PCT - the percent of the total for the column.

4. TOT PCT - the percent overall

5. ROW TOTAL - the count and percent that the row is of the whole

6. COLUMN TOTAL - the count and percent that the column is of the whole.

Example

3677 records were found at YOMM (Oswego main library) that were language material printed (type of record = a).

These represent 94.6% of the 3888 records that were language material printed (type of record = a).

They also represent 99.4% of the 3698 records in YOMM (Oswego main library).

Of all the records (3909 of them), 94.1% were at YOMM (Oswego main library) and were language material printed (type of record = a).

3888 records, or 99.5% of the total, were language material printed (type of record = a). The remaining 21 records were music scores printed all at YOMM.

3698 records, or 94.6% of the total, were at YOMM.

Example 2 - Analysis of record type by holding library at SUNY Oswego

In crosstabulations, data can be analyzed in up to ten dimensions. The format is exhaustible in two dimensions to account for all combinations of any two data elements. Within this general framework, the format is controlled with a standard layout. Each row and column is totalled and expressed as a percentage of the whole. Within each box the count of records which fit the criteria is reported, and the percentage of the row, column and total records analyzed is computed and reported.

The following additional examples of crosstabulation show but a few of the types of analysis possible.

*****CROSSTABULATION OF*****									
IMPRINT			IMPRINT DATE RANGE			BY VHLC		HOLDING LIBRARY CODE	

IMPRINT		VHLC					ROW TOTAL		
		COUNT ROW PCT COL PCT TOT PCT	I	YOMR	I	YOMM		I	
PRE 1960	4	I	31	I	1212	I	1243		
		I	2.5	I	97.5	I	32.0		
		I	14.7	I	33.0	I			
		I	0.8	I	31.2	I			
		-I	-	-	-	-I	-		
1960-69	3	I	19	I	864	I	883		
		I	2.2	I	97.8	I	22.7		
		I	9.0	I	23.5	I			
		I	0.5	I	22.2	I			
		-I	-	-	-	-I	-		
1970-74	2	I	47	I	725	I	772		
		I	6.1	I	93.9	I	19.9		
		I	22.3	I	19.7	I			
		I	1.2	I	18.6	I			
		-I	-	-	-	-I	-		
1975-	1	I	114	I	876	I	990		
		I	11.5	I	88.5	I	25.5		
		I	54.0	I	23.8	I			
		I	2.9	I	22.5	I			
		-I	-	-	-	-I	-		
COLUMN TOTAL			211		3677		3888		
			5.4		94.6		100.0		

Example 3 - Analysis of imprint dates by holding library at SUNY Oswego

This table demonstrates the ability of the programs to analyze by range of values as well as by specific values.

*****CROSSTABULATION OF*****
 LBL BIBLIOGRAPHIC LEVEL BY LTOR TYPE OF RECORD

		COUNT		I LTOR		ROW PCT		COL PCT		TOT PCT		ROW TOTAL			
LBL		I	J	I	I	I	H	I	E	I	C	I	B	I	
S	serials	I	0	I	0	I	2	I	0	I	0	I	0	I	2
		I	0.0	I	0.0	I	100.0	I	0.0	I	0.0	I	0.0	I	0.3
		I	0.0	I	0.0	I	33.3	I	0.0	I	0.0	I	0.0	I	
		I	0.0	I	0.0	I	0.3	I	0.0	I	0.0	I	0.0	I	
M	monographs	-I		-I		-I		-I		-I		-I		-I	
		I	18	I	114	I	4	I	78	I	308	I	236	I	758
		I	2.4	I	15.0	I	0.5	I	10.3	I	40.6	I	31.1	I	99.7
		I	100.0	I	100.0	I	66.7	I	100.0	I	100.0	I	100.0	I	
		I	2.4	I	15.0	I	0.5	I	10.3	I	40.5	I	31.1	I	
COLUMN TOTAL			18		114		6		78		308		236		760
TOTAL			2.4		15.0		0.8		10.3		40.5		31.1		100.0

Types of record

- J sound recordings, music
- I sound recordings, language or spoken
- H microform publications
- E maps and atlases, printed
- C music scores, printed
- P language materials, manuscript

Example 4 - Analysis of all non-type "a" (i.e. all non-book) records by bibliographic level (i.e. serial or monograph) from the combined tapes of all advisory institutions.

2. Selection of Elements for Analysis

The Advisory Group proposed a set of OCLC/MARC record data elements to be summarized. Analysis of these fields is useful in three broad areas:- (1) for analysis of collection strength, growth, and change including comparisons of collections within and among institutions, (2) to eliminate some of the manual record-keeping necessary to file statistical reports, and (3) to gather management data which can be used, especially in technical services, to analyze acquisitions, cataloging and processing workloads, to plan space and staff allocations, etc.

N.B. This list includes only the fixed fields of monographic (book) and serial formats. A similar evaluation should be done of the unique fixed fields of other formats.

<u>Subfield Name</u>	<u>For Collection Analysis</u>	<u>For Statistical Reports</u>	<u>For Workload Analysis</u>	<u>Comments</u>
Type of Record	X	X	X	
Bibliographic Level	X	X	X	
Gov't. Pub. Indicator	X	X	X	
Language Code	X		X	For complete information, needs to be linked to analysis of the 041 (language) field. Of special interest to Area Studies.
Cataloging Source Code			X	
Form of Reproduction	X	X		
Encoding Level			X	
Conference Pub. Inc.	X			Important to sciences, soc. sciences.
Country of Pub.	X			
Type of Date	X			
Fiction Indicator	X			
Form of Contents Designator	X			
Intellectual Level	X			
Date 1/Date 2	X			Analysis depends upon Type of Date.
Latest Entry Design			X	
Original Alphabet of Title			X	
Physical Medium Designator		X		
Type of Material & Form of Contents	X			
Frequency			X	Possible analysis as related to subscription price.
Publication Status Code	X		X	

3. Description of Content Analysis

As described in section III, Content Analysis is a procedure which breaks all records on the tape, or in the shelflist proper, into small subsets or classes of titles each corresponding to a single short range in the classification scheme. These elementary classes are grouped together to form totals and subtotals for larger ranges in successive levels until the total for the entire range of the classification scheme (e.g. Dewey 001-999.99999, L.C. A-ZZ) is computed.

The computer programs used in this procedure are the following:-

<u>Program Name</u>	<u>Functions</u>
PARTITION	Assigns the records on the selected tape to the smallest classes of titles in the class system.
CLASSIFY	Forms larger classes of titles, corresponding to wider ranges of call numbers, from the elementary classes created by PARTITION.
AGGREGATE	Counts the number of titles in each of the classes formed in the previous steps. Computes percents within each larger class and overall.
RANK	Ranks subclasses of titles within classes and overall.
REPORT	Generates the output report.

It is important to note that larger classes are formed by combining the contents of elementary classes, not by assigning titles directly to the larger classes based on their call numbers. This ensures that the larger classes comprise only titles in their elementary classes. It also allows ranges of call numbers not yet defined in the classification schedule to be excluded even though they may fall into larger ranges that seem to correspond to larger classes.

Of the 25,622 selected records, 505 or 0.2% were rejected because they did not fall into an elementary class. Of these, approximately 450 appeared to be valid but were rejected because they fell into additions to the L.C. Classification Schedules which had not yet been incorporated into the breakdown of classes used. This demonstrates the need to keep the breakdown chosen for Content Analysis current with the most recent edition of the classification schedules.

For the purposes of this project, the A.L.A. R.T.S.D. Guidelines (1) were adopted which is a breakdown of the L.C. Classification Schedules into 482 elementary classes. Subtotals are computed at the end of each complete letter and sometimes at significant points within a letter. The breakdown without subtotals is in Appendix 3.

4. Shelf List Analysis Segment of Content Analysis

The program can add to the current data, values from the existing shelf list in order both to measure and monitor total collection strength and assess the impact of current acquisition policy on disciplinary distribution in the collection.

This later ability is of supreme importance in any collection management program, particularly when assessed over time. Ideally, a library would do a static (i.e. manual) shelf list count, then match its current acquisitions against the shelf list each year. A new facility in SPSS for analyses of data over time called "lagged variables" is well suited to this task, as are the original programs developed by the project. It is difficult to overestimate the importance of this management data to librarians and academic administrators. The one year project does not demonstrate these results but such a facility will be included in the tape analysis service.

Two of the libraries (Cornell and Binghamton) had already performed shelf list analyses using the A.L.A. R.T.S.D. Guidelines (1). The other two libraries have completed the manual count of their own shelf lists according to the following guidelines (2):-

1. "If the majority of holdings are classified according to Dewey (or any classification scheme other than LC) do not report.
2. If the majority of holdings are classified according to L.C., report L.C. holdings', disregard all other holdings.
3. Include all major campus holdings, if at all possible, i.e. include Law Library, Biomedical Library and other major resources, even though these libraries may not be centrally administered, and even though including these libraries may involve the counting of separate shelf lists.
4. Report holdings strictly according to L.C. schedules provided, i.e. do not report holdings according to alternative breakdown.
5. Here follow the actual procedures for performing the shelf lists count:

Measure number of centimeters in shelf list(s) according to prepared classification breakdown. When measuring, compress cards comfortably; do not squeeze tightly. In order to achieve the most accurate approximation of a title by title count, have at least two independent measurements taken. In case the figures do not agree, have the particular section of the shelf list re-checked, and use the low or median figure. Report measurement by converting centimeters to numbers of titles (at 38 cards to one centimeter). It is not necessary to calculate percentages since this will be done by computer, faster and more accurately.

6. Do not attempt to account for volumes held, either by converting cards measured to number of volumes, or by reducing card count to reflect extension/continuation cards. At this point, we are concerned with a rough title count only."

The same programs were used for the Content Analysis of the shelf list as were used for the Content Analysis of the OCLC/MARC tape. The only difference was in the preparation of the data. Using the SELECT Utility mentioned earlier, the keypunched shelf list data was reformatted to be in the same format as the selected data from the OCLC/MARC tape.

5. Description of Component Analysis

Perhaps the most remarkable development which emerged during the project was the realization of the potential of the powerful disciplinary tool Component Analysis. It was decided to test Component Analysis on different types of disciplines (humanities, social science, etc.). The computer programs used to perform Component Analysis are exactly the same as those used for Content Analysis. The difference lies in the tables which define the groups of class numbers.

As with Content Analysis, the most elementary ranges of class numbers are not allowed to overlap. Elementary classes are composed of titles falling into one or more of the elementary ranges. Elementary classes are grouped together to form totals for what were larger ranges of numbers in Content Analysis, but which correspond to components of the collection in Component

Analysis. Such totals may be formed at successive levels, each total corresponding to a component, until the total for the entire discipline is computed. The main difference from Content Analysis is that a component does not necessarily represent a contiguous range of call numbers; indeed, it may be defined as any grouping of subcomponents. Furthermore, components can be made to overlap by including the same subcomponents. It is the latter point which distinguishes the tables for a Component Analysis from those for a Content Analysis.

The coding of the tables for either Content or Component Analysis is a non-trivial task involving:-

1. the assignment of a six digit identifier to each elementary class and each component;
2. the explicit coding of containment relations between an elementary class and a component, or between a component and the higher-level component or components containing it;
3. the coding of the ranges of call numbers falling into each elementary class;
4. the coding of the labels to be used for each component (e.g. PB2101-2199 Welsh, Cymrie);
5. the testing and correction of the tables as coded.

As indicated previously, the Advisory Group defined five different disciplines, drawn from among the general classes: humanities, physical sciences, and social sciences, to test the programs.

The five disciplines selected were:

Anthropology
Linguistics
Geology/Earth Sciences
Industrial Arts
American Philosophy and Religion (American Studies)

The definitions are found in Appendix 3. Each discipline is defined in successive levels of precision. If any level is expanded to an additional level, (except level 1), it is flagged with '+'; and each class so expanded is separately identified with '++'.

Example (See Linguistics in Appendix 3):-

P-PZ Language and Literature +

++ PA Classical languages and Literature

6. Description of Overlap Analysis

Having completed the statistical summary reports, Content Analysis, and Component Analysis, the one remaining, not commenced until the final quarter of the project, was Overlap Analysis.

Overlap Analysis identifies multiple uses of the same OCLC record by libraries either at the holding library level in an institution, at the holding library level among institutions, or at the institution level among institutions.

The AGGREGATE program was used to count the number of institutions using each OCLC bibliographic record. The output file was composed of one record for each holding library for each OCLC record used by the library; multiple uses of the same OCLC record by the same holding library were eliminated. Each output record contained the number of institutions (N.B. not holding libraries) using the same OCLC record.

Using this file as input, the SPSS package generated crosstabulations of the number of institutions holding the same OCLC record by institution and holding library as shown in the following examples. Column 1 shows the breakdown of OCLC records used by exactly one institution. Column 4 shows the records common to all four institutions. Columns 2 and 3 show the records held by any combination of two and three institutions respectively.

The presence of "unique" records (those held by exactly one institution) is suspect because it is unusually high and similar for all institutions. It is due to the short time period analyzed (twelve weeks), the differences in cataloging practices at the four institutions, and the relative timeliness of the different selection and acquisition processes.

In Example 5 showing the breakdown by institution, one would expect the number of titles in column 4 (common to all institutions) to be the same for all institutions, but it isn't. The reason is that two holding libraries at Cornell used the same title which was therefore counted twice.

OVERLAP ANALYSIS — OCLC / MARC TAPE DATA						
*****CROSSTABULATION OF*****						
VHLC HOLDING INSTITUTION		BY WT		# OF INSTITUTIONS USING SAME OCLC RECORD		

VHLC	COUNT ROW PCT COL PCT TOT PCT	WT				ROW TOTAL
		1.1	2.1	3.1	4.1	
ZBM ONEONTA	I	2990 I	505 I	111 I	8 I	3614
	I	82.7 I	14.0 I	3.1 I	0.2 I	14.1
	I	13.5 I	17.2 I	25.8 I	24.2 I	
	I	11.7 I	2.0 I	0.4 I	0.0 I	
YCM CORTLAND	I	1156 I	273 I	67 I	8 I	1504
	I	76.9 I	18.2 I	4.5 I	0.5 I	5.9
	I	5.2 I	9.3 I	15.6 I	24.2 I	
	I	4.5 I	1.1 I	0.3 I	0.0 I	
COO CORNELL	I	11607 I	1147 I	134 I	9 I	12897
	I	90.0 I	8.9 I	1.0 I	0.1 I	50.3
	I	52.2 I	39.1 I	31.2 I	27.3 I	
	I	45.3 I	4.5 I	0.5 I	0.0 I	
BNG BINGHAMTON	I	6470 I	1011 I	118 I	8 I	7606
	I	85.1 I	13.3 I	1.6 I	0.1 I	29.7
	I	29.1 I	34.4 I	27.4 I	24.2 I	
	I	25.3 I	3.9 I	0.5 I	0.0 I	
COLUMN TOTAL		22223 86.7	2936 11.5	430 1.7	33 0.1	25622 100.0

Example 5 - Overlap among Institutions

Two tables were generated to show the breakdown by holding library. Example 6 shows the comparison of holding libraries among all four institutions, while Example 7 shows them being compared within each institution.

OVERLAP ANALYSIS — OCLC/ MARC TAPE DATA								
*****CROSSTABULATION OF*****								
VHLC		HOLDING LIBRARY		BY WT		# OF INSTITUTIONS USING SAME OCLC RECORD		

VHLC		COUNT	I	WT				ROW TOTAL
				1.1	2.1	3.1	4.1	
		ROW PCT	I					
		COL PCT	I					
		TOT PCT	I					
ZBMR			I					
		123	I					148
		83.1	I					0.6
		0.6	I					
		0.5	I					
			I					
			I					
			I					
			I					
			I					
			I					
			I					
ZBMN			I					14
		13	I					0.1
		92.9	I					
		0.1	I					
		0.1	I					
ZBMM			I					3447
		2849	I					13.5
		82.7	I					
		12.8	I					
		11.1	I					
ZBMK			I					3
		3	I					0.0
		100.0	I					
		0.0	I					
		0.0	I					
ZBML			I					1
		1	I					0.0
		100.0	I					
		0.0	I					
ZBMC			I					1
		1	I					0.0
		100.0	I					
		0.0	I					
YCMR			I					80
		64	I					0.3
		80.0	I					
		0.3	I					
COLUMN TOTAL								25622
								100.0

(CONTINUED)

(CONTINUED)

Example 6 - Overlap among Holding Libraries In Four Institutions (only the first page, containing seven holding libraries, is shown)

Note that the sum of the records of the holding libraries with codes beginning with ZBM is 3,614, and this agrees with the number of records at Oneonta shown in Examples 5 and 7.

OVERLAP ANALYSIS — OCLC / MARC TAPE DATA

*****CROSSTABULATION OF*****
 VHLC HOLDING LIBRARY BY WT # OF INSTITUTIONS USING SAME OCLC RECORD
 CONTROLLING FOR...
 VHIC HOLDING INSTITUTION VALUE = ZBM ONEONTA

VHLC		WT					ROW TOTAL
		COUNT					
		ROW PCT					
		COL PCT					
		TOT PCT	1.1	2.1	3.1	4.1	
ZBMR		123	20	4	1	148	
		83.1	13.5	2.7	0.7	4.1	
		4.1	4.0	3.6	12.5		
		3.4	0.6	0.1	0.0		
ZBMN		13	1	0	0	14	
		92.9	7.1	0.0	0.0	0.4	
		0.4	0.2	0.0	0.0		
		0.4	0.0	0.0	0.0		
ZBMM		2849	484	107	7	3447	
		82.7	14.0	3.1	0.2	95.4	
		95.3	95.8	96.4	87.5		
		78.8	13.4	3.0	0.2		
ZBMK		3	0	0	0	3	
		100.0	0.0	0.0	0.0	0.1	
		0.1	0.0	0.0	0.0		
		0.1	0.0	0.0	0.0		
ZBMI		1	0	0	0	1	
		100.0	0.0	0.0	0.0	0.0	
		0.0	0.0	0.0	0.0		
		0.0	0.0	0.0	0.0		
ZBMC		1	0	0	0	1	
		100.0	0.0	0.0	0.0	0.0	
		0.0	0.0	0.0	0.0		
		0.0	0.0	0.0	0.0		
COLUMN TOTAL		2990	505	111	8	3614	
		82.7	14.0	3.1	0.2	100.0	

Example 7 - Overlap among Holding Libraries in One Institution

To see exactly which combination of holding libraries and institutions used the same OCLC/MARC record, the SELECT utility was employed to list just those records used by more than one institution, as shown in Example 8. The format of the report is as follows:-

Column Contents

1. OCLC number identifying the OCLC bibliographic record
2. Code of the holding library using the record.
3. Parsed L.C. Call Number.
4. Type of record ("a" is language material printed).
5. Bibliographic level ("m" is monograph)

Each of the last four columns show use by an institution. A column has an "X" in it if the holding library (column 2) is in the institution.

6. Used by Binghamton (BNG)
7. Used by Cornell (COO)
8. Used by Cortland (YCM)
9. Used by Oneonta (ZBM)

OCLC #	HOLDING LIBRARY	LC #	TYPE	LEVEL	BNG	COO	YCM	ZBM
1951130	BNGS	QB 0501	A	M	X			
	COOP	QB 0501	A	M		X		
	COOO	QB 0501	A	M		X		
1955548	BNGG	GF 0041	A	M	X			
	COOF	HM 0291	A	M		X		
	YCMM	GF 0041	A	M			X	
	ZBMM	GF 0041	A	M				X
1957990	COOO	PS 3501.N4	A	M		X		
	YCMM	PS 3501.N4	A	M			X	
1957998	BNGG	PN 0471	A	M	X			
	ZBMM	PN 0471	A	M				X
1958063	BNGG	PR 4144.M63	A	M	X			
	COOO	PR 4144.M6	A	M		X		
1958067	BNGG	HM 0131	A	M	X			
	COOL	HM 0131	A	M		X		

Example 8 - Overlap: Specific OCLC/MARC Records

No Content Analysis was performed on the titles used by only one institution, since they comprise 86.7% of the titles and the result would therefore be similar to the Content Analysis of all titles.

Part V EVALUATION

The evaluation of the project took two forms. First, the computer programs were evaluated. That the programs work was evident from the output reports. The desired result of the project was a set of programs which would analyze OCLC tapes, and that objective was attained. It is also necessary, however, to evaluate the program structure to ascertain measure of complexity, maintainability and transferability.

The second evaluation concerns the utility of the output reports as management information tools as perceived by the libraries whose test data was used in the project. These evaluations are reported in this section.

September 1, 1977

Memo to: Mr. Glyn Evans, Project Director
From: Mr. Don Franz, Consultant
Subject: Critique of the Collection Development
Analysis programs

The Collection Development Analysis programs have been critiqued, using as a criteria, an objective measure of complexity developed by this writer. The measure is based on control of complexity through application of management principles of organization.

First, the criteria is described. Then the summary figures are presented, followed by an analysis and discussion of the figures and their implications. This is followed by a critique conclusion.

Donald R. Franz

Donald R. Franz

1020 S. Warson Rd.

St. Louis Mo. 63124

THE CRITERIA DESCRIBED

No overall quantitative measure exists for determination of relative effectiveness in program design. The first criteria of effectiveness is that the programs accurately produce the outputs specified by the user. Next in importance in this writer's opinion is the degree of program adaptability. Adaptability affects the program's ability to withstand modification, maintenance, and enhancement. As in living organisms, lack of adaptability leads directly to extinction. Of lesser importance in determining program effectiveness is the efficiency of use of the computer system resources. No attempt will be made here to critique this aspect of program effectiveness.

This writer asserts that adaptability is directly related to complexity, and that complexity is related to the number of unique states of a system (function). This writer further asserts that the traditional management model of a functional heirarchy provides an effective framework for evaluation of computer program design. Each sub-system (function) within the overall system (program organization) has some number of unique states, and the total complexity is a function of the complexity (number of unique states) of every sub-system within the system.

In one extreme case, if the sub-systems are totally independent of one another, the total complexity can be represented by the sum of the individual sub-system complexities. In the other extreme case, if the sub-systems exhibit no measure of independence, the total complexity can be represented by the product of the individual sub-systems.

In computer programs, an instruction series qualifies as a relatively independent sub-system if the series of instructions has a single entry point, a single exit point and no unconditional transfers of control out of the instruction series. In a well-designed program, the "functions" are clearly marked with action-oriented descriptive procedure names and possibly additional comments.

Use of common data items by two different functions keeps them from being absolutely independent, but procedural independence as described above is easily attainable through application of the classic management principles of organization.

THE CRITERIA APPLIED TO THE COLLECTION DEVELOPMENT ANALYSIS PROGRAMS

For the eleven programs critiqued, the following figures summarize the number of procedurally independent functions and their complexity measures.

No. of unique states	No. of functions at this level	Individual complexity measure	Total complexity this level
2 ⁰	4	1	4
2 ¹	104	2	208
2 ²	90	4	360
2 ³	28	8	224
2 ⁴	12	16	192
2 ⁵	5	32	160
2 ⁶	4	64	256
2 ⁷	0	128	0
2 ⁸	2	256	512

Total number of functions 249

Total complexity 1,916

Average functional complexity $1,916/249 \approx 8$

It is interesting to note that the Collection Development Analysis programs have 50% of the total complexity contained in 13 functions. In other words, approximately 5% of the functions account for 50% of the program complexity. An IBM study of many programs revealed that 4% of the code was involved in 50% of the program maintenance. A separate study showed 8%.

Although the criteria in this critique is based on number of functions instead of lines of code, this writer believes the same phenomena is being detected, and that a ranking of the functions in descending order on magnitude of the complexity measure will highlight the functions most likely to account for maintenance problems and cost.

The function complexity summary shows that complexity (average value of 8) has been kept well under control. Only eleven functions were found to exceed a complexity of 16.

A sampling of programs from industry will show much higher average complexity values even though many of the applications have considerably less intrinsic complexity. For example, one "production" program reviewed by this writer showed no procedurally independent sub-functions and as a result had a complexity measure greater than the eleven Collection Development Analysis programs combined. The application was trivial but the program, after two years in production status, continues to experience failures. The program is judged by maintenance programmers as "untouchable". Another production program modified by this writer had identifiable procedurally independent functions, however the function that required the modification contained 35 lines of COBOL code, yet had a complexity measure of 13,8241.

CONCLUSION

The Collection Development Analysis programs show that a rigid design discipline has been followed, resulting in very effective control of complexity in the computer programs. Adaptability and ease of maintainability of these programs will be significantly better than what is accepted as par, based on most programs found in industry today.



STATE UNIVERSITY OF NEW YORK AT BINGHAMTON

Binghamton, New York 13901

Director of Libraries
Telephone (607) 798-2346

MEMORANDUM

DATE: October 4, 1977
TO: Glyn Evans
FROM: *Ina C. Brownridge*
Ina C. Brownridge, Director of Libraries
SUBJECT: Critique of the SUNY Archival Tape Project

After reviewing the reports generated by the Archival Tape Project, and having discussed with Shirley Leung and John Ryland, we feel that the methodology used definitely has positive aspects. It would be useful for developing various profiles for collection development, acquisitions programs, and possibly other management uses.

We would be interested in seeing the Project equipped with the capability of coordinating with the American publishing output. Another major concern we have is that the cost for utilizing the Project be kept to a minimum for individual institutions as technology will continue to advance whereas book budgets may continue to shrink.

The SUNY Binghamton Library would be interested in making use of this Project on a limited basis over a period of time if it is available at a low cost.

I. C. B.

ICB:cb
cc: Shirley Leung
John Ryland

MEMORIAL LIBRARY
State University of New York
College at Cortland
Cortland New York 13045

DATE: Sept. 21, 1977

TO: Glyn T. Evans

FROM: Mary Beilby, Collection Development Librarian
Ellen Rappaport, Head of Technical Services

RE: Collection Development Analysis Using OCLC Archival Tapes

The programs developed in this project appear to have great potential for this library and for other libraries using the OCLC system for cataloging. Some applications seem to be feasible for individual libraries and others for multi-library systems.

Individual Library Applications:

Statistical Reporting: For libraries doing the largest portion of their cataloging through OCLC, both local and HEW statistical reports could be generated using the OCLC tapes and the programs developed in this project. These reports should be reviewed by the libraries in order to edit the information which might be misleading due to local practice. This would include any cataloging for which OCLC is not used.

A statistical report profile should be agreed upon which could be augmented by special local instructions. The volume count which appears in the 049 field may be difficult to extract, since it often appears as vol. 1-3. Many libraries have not been diligent in reporting withdrawals and added copies through the terminal.

Some uses for local statistical reporting would be: workload analysis, shelving and space requirements, financial analysis and collection development.

This library presently spends approximately \$800 annually in staff time to collect and report statistics. The OCLC tapes would provide more complete data in many categories but would require additional effort in "cleaning up" the OCLC records and assuring full and accurate data. Manual statistics would need to be kept for categories unavailable on the OCLC record such as microfilm, microcard, and microfiche. This information is needed in this library primarily to plan shelving requirements.

If prices were available on the archival tapes, estimates could be made of average cost per unit by format, form of reproduction, discipline, etc. This would be of use in budget preparation and collection development.

Of course, the basic problem of using archival tapes to generate library statistics is establishing a base figure for each of the variables on which to build the ongoing collection figures.

Collection Development: Most libraries are presently unable to monitor the growth of their collections by discipline, by format, by language or to compare their collection growth with academic programs or library use patterns. Use of the OCLC archival tapes will allow libraries to compare disciplinary growth patterns with curriculum and with circulation patterns. The latter would be facilitated in a library with an automated circulation system with capability to analyze circulation by class numbers or disciplinary groupings. Next year's project to relate academic programs to the library classification system will help to identify which library materials support a given academic program.

Multi-departmental or Campus Library System Applications:

The above statical reporting applications may also be employed by a multi-departmental or multi-campus system. Coordinated collection development and monitoring can also be facilitated through the use of the disciplinary heirarchies possible in the Context program.

Considerable cost savings could be made by extracting a minimal amount of data and selecting a random sample via the computer programs available. The reliability of such samples could be established by selecting more than one sample and using SPSS reliability programs. The full data record could then be extracted for the sample items and further statistical operations performed.

Buying Patterns: Crosstabulations and histograms may be used to analyze the relative emphasis of current buying by format, discipline, language and other characteristics. If long-term buying is represented on archival tapes, the proportion of duplication and overlap among the collections may be analyzed.

Earlier reference to relating library collections to academic programs and library use patterns is also relevant to multi unit library systems.

JAMES M. MILNE LIBRARY STATE UNIVERSITY COLLEGE ONEONTA, N.Y. 13820

TO Glyn Evans

DATE September 28, 1977

FROM John Crowley / Linda Arnold

RE: Evaluation of Collection Analysis Project

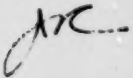
What would we use this report format for in the future?

If we could afford the computer time the following applications would be possible:

- 1) Verify the holdings in local academic areas seeking to add courses, minors, majors.
- 2) Ascertain strengths of various undergraduate collections (for ILL and other uses).
- 3) Utilize for ongoing statistical compilations, reports and correlations (by extending the program).
- 4) Alter our formula for funding departmental book allocations.

Funding by SUNY Central for system wide retrospective inputing would enhance these and other applications (temporary service money).

JVC/gs



Part VI ESTABLISHMENT OF A TAPE ANALYSIS SERVICE

The original grant request proposed the establishment of a tape analysis service based on these programs, assuming of course that the programs worked and were useful.

In light of the success of the project and the interest it is creating, SUNY Office of Library Service is currently reviewing the possibility of establishing such a service. The service would be available to all libraries using the OCLC system, either individually or as a member of a group of libraries which seek to compare their data. The programs have been written with the requisite flexibility as a paramount design criterion of such a service. Although flexibility is available, there will be a clear cost advantage in using already designed and implemented analyses to avoid expensive manual set up time. If many libraries opt for the same analyses, gradually a corpus of knowledge about nationwide library collection patterns, will accrete.

When decisions about the tape service are made, announcements will be made through the normal channels of professional communication, including the OCLC Newsletter and the major journals.

Part VII PUBLICATION OF RESULTS

After the first announcement by Office of Education, which appeared in Library Journal, the Office of Library Services sent a further press release to the major professional journals:-

The Office of Library Services in Central Administration has been awarded a grant totaling \$42,415 by the U.S. Office of Education, Department of Health, Education and Welfare.

This is one of nineteen grants and contracts awarded by HEW under Title 11-B of Higher Education Act of 1965 as amended for library research and demonstration projects concerned with the improvement of libraries and information science.

One of the urgent needs of libraries is the development of management data indicating current collection growth analyzed by discipline. Such data is essential for library planning when related to present shelflist measurements, curricula development and departmental acquisition allocations. Further, knowledge of relative disciplinary strengths and growth rates among separate departmental libraries on a campus, separate campuses in a multicampus system, or libraries in a geographic region or disciplinary group, provides invaluable assistance to librarian and academic administrator, and can lead to informed cooperative acquisition proposals.

The grant will be used for collection development and analysis based on OCLC-MARC Distribution Tapes. As more libraries across the nation use the OCLC system, the OCLC-MARC Tape Distribution Service offers a medium for gathering data and performing (by machine) statistical analyses by discipline, medium, library and sets of libraries. The grant funds the writing of such analytical programs and the development of a tape analysis service for libraries.

Working with the Project Director Glyn T. Evans are a consultant and programmer/analyst. Three SUNY libraries, Oneonta, Cortland, Binghamton, and Cornell University, libraries are participating in the work by contributing test data, advice, and by performing an evaluation of the reports.'

The press release appeared in C.R.L. News, Journal of Library Automation, the OCLC Newsletter, and SUNY News, among other publications.

On May 19, at the Theme Session of the Midyear Conference of the American Society for Information Science at Syracuse, New York, the Principal Investigator presented a paper "The cost of information about library acquisition budgets". This paper contains a brief description of the project in the broader context of library economics. The paper is being prepared for publication in the journal Collection Management, in an early issue of Volume 3.

A verbal presentation of the project was made by the Principal Investigator at the SUNY/OCLC workshop "Uses of OCLC/MARC Distribution Tapes" held in Albany on Friday, October 7, 1977. The program attracted some 200 participants, drawn primarily from the SUNY/OCLC libraries and other OCLC networks. A list of the speakers and their topics follow:-

1. J. Barrantine Introduction to OCLC/MARC Distribution Tapes
Assistant Director for Research
Ohio College Library Center
2. Randall Carvey COM Cataloging Update
Solinet Network

3. James Kennedy
Amigos Network The Networks' Role in OCLC/MARC Tape Services: Experience at AMIGOS
4. Miriam Drake
Purdue University
Chairperson INCOLSA Tape
Service Committee Plans for Tape Services at INCOLSA, Indiana
5. E. Brownrigg
Director, Academic
Computing, N.Y.U. OCLC Tapes and Mini-computer Library Circulation Systems
6. Van Judd
Assistant Director
Technical Services
N.Y. State Library Closing the New York State Library Catalog: a Report
7. Pauline Atherton
Professor
Syracuse University
S.L.I.S. Enhancement of MARC Bibliographic Records for Improved Subject Access
8. Glyn T. Evans
Director of Library Services
SUNY Central Collection Development Analysis from OCLC/MARC Distribution Tapes

The work was the subject of a seminar for the Ph.D. graduates held at Rutgers Library School in November 1977, at which the Project Director was present. A number of other speaking invitations to report on the project have been tentatively suggested to the Project Director. A major paper to be offered to one of the major professional journals is being prepared by the project team.

Finally this report has been sent to the ERIC Clearinghouse for inclusion in its reports and data base.

Careful records of all enquiries about the project have been kept and interim reports plus this final report mailed to all correspondents. The final report has been mailed to:-

OCLC
OCLC Regional Networks and Council for Computerized Library Networks members
National Commission Library and Information Science/Council on Library Resources and other foundations
Professional organizations including Association of Research Libraries
Library professional journals
Selected international library organizations (IFLA, UNESCO, ASLIB, Library Association, Unisist, etc.)
A.L.A.R.T.S.D. Collection Development Committee
Selected professionals working in this field.

Part VIII CONCLUSION

The project goals were to write a series of programs which would perform collection development analyses on data derived from library data cataloging found on OCLC/MARC tapes.

These goals have been met. The reports called for in the original project have been developed. In addition, further reports not called for in the original project, which are an extension of the basic ideas not fully appreciated at the time of the grant proposal (December 1975) have also been written.

The reports have been evaluated by the Library Advisory Group and found to be valuable management tools. The programs have been reviewed by the Program Design Consultant and found to be well structured, easily modified and flexible, as required by the basic criteria. They work.

The project ran for three months longer in calendar time than originally proposed, but this was due to a delayed start. From start up date the program ran on schedule and as planned.

SUNY Central Office of Library Services is planning a tape analysis service based on the programs as proposed in the original grant request and developed during the project.

A further project "Development of a Responsive Library Acquisitions Formula", which is using many of the programs developed by this project, has been awarded to SUNY Office of Library Services, commenced in October, 1977.

BIBLIOGRAPHY

1. "Guidelines for the Formulation of Collection Development Policies." A.L.A., R.T.S.D., Resources Section, Library Resources and Technical Services, 21 (1), 40-47, Winter 1977.
2. L.D. Ortopan, Titles Classified by the Library of Congress Classification - University of California Libraries 1973, General Library, University of California, Berkeley, 1974.
3. Evans, G.T. "The Cost of Information About Library Acquisition Budgets" Collection Management 2 (1), 1978. (in press).
4. Nie, Norman H. et. al, Statistical Package for the Social Sciences (Second Edition), McGraw-Hill, 1975.
5. Nie, Norman H. and Hull, C. H., SPSS Batch Release 7.0 Update Manual, SPSS Inc., 1977.

Appendix 1 PROJECT STAFF AND ADVISORY GROUP

A. Project Staff

Principal Investigator
Glyn T. Evans
Director of Library Services
SUNY Central Administration
99 Washington Avenue
Albany, N.Y. 12243

Programmer/Analyst
Roger D. Gifford
Computer Center
SUNY Central Administration
99 Washington Avenue
Albany, N.Y. 12243

Program Design Consultant
Donald Franz
1020 S. Warson Road
St. Louis, Missouri 63124

B. Advisory Group

SUNY Binghamton
Ina Brownridge, Director
Cecelia Dulik
Shirley Leung

State University of New York
at Binghamton
Vestal Parkway East
Binghamton, New York 13901

SUNY Cortland
Selby Gration, Director
Ellen Rappaport
Mary Beilby

State University College at Cortland
Cortland, New York 13045

SUNY Cornell
Gormly Miller, Director, Cornell
University Libraries
Mary Lee Xanco
Henk Edelman

Olin Library
Cornell University
Ithaca, New York 14853

SUNY Oneonta
Richard Johnson, Director
John Crowley
Linda Arnold

James M. Milne Library
State University College at Oneonta
Oneonta, New York 13820

Appendix 2 ADVISORY GROUP MEETINGS

Meeting 1 - Albany, N.Y. - September 16, 1976

SUNY Library Services
Glyn T. Evans
Teresa Strozik
Roger Gifford
Jane Roberts
Mary Jones
Mary Goldthorpe

SUNY Binghamton
Cecilia Dulik

Cornell
Mary Lee Xanco

SUNY Cortland
Ellen Rappaport
Mary Beilby

SUNY Oneonta
John Crowley
Linda Arnold

Meeting 2 - SUNY Cortland - May 17, 1977

SUNY Library Services
Glyn T. Evans
Roger Gifford

SUNY Binghamton
Ina Brownridge
Shirley Leung

Cornell
Mary Lee Xanco

SUNY Cortland
Selby Gration
Ellen Rappaport
Mary Beilby

SUNY Oneonta
John Crowley
Linda Arnold

SUNY Oswego
Anne Commerton

Meeting 3 - SUNY Cortland - September 12, 1977

SUNY Library Services
Glyn T. Evans
Teresa Strozik
Roger Gifford
Donald Franz

SUNY Binghamton
Shirley Leung

Cornell
Henk Edelman

SUNY Cortland
Selby Gration
Ellen Rappaport
Mary Beilby

SUNY Oneonta
John Crowley
Linda Arnold

SUNY Oswego
Anne Commerton

Appendix 3

CONTENT AND COMPONENT ANALYSIS TABLES

1. R.T.S.D. Resource Section Collection Development Guidelines (1)
2. Anthropology
3. Linguistics
4. Geology/Earth Science
5. Industrial Arts
6. American Philosophy and Religion (American Studies)

N.B. The names associated with the ranges of call numbers are intended to be indicative rather than definitive.

**R.T.S.D. RESOURCE SECTION
COLLECTION DEVELOPMENT GUIDELINES**

AC	F2161-2175	NX	PN80-99	P5501-690	RC321-431
AF	F2201-3799	P	PN101-249	P5700-893	RC435-576
AG	G1-890	PA1-2995	PN441-1009	P5991-3390	RC578-632
AI	G1001-3102	PA3000-3049	PN1010-1588	P53500-3549	RC633-935
AM	G3180-9980	PA3050-4500	PN1600-1657	P53550-3576	RC936-951
AN	GA1-87	PA5000-5665	PN1660-1864	PT1-951	RC952-1299
AP	GA100-1999	PA6000-7041	PN1865-1989	PT1100-1485	RD
AS	GB	PA8001-8595	PN1991-1992	PT1501-1695	RE
AY	GC	PB1-431	PN1993-1999	PT1701-1797	RF
AZ	GF	PB1001-3029	PN2000-2081	PT1799-2592	RG
B1-68	GN1-295	PC1-400	PN2085-2219	PT2600-2659	RJ
B69-789	GN307-686	PC601-872	PN2220-2298	PT2660-2688	RK
B790-5739	GN700-875	PC890	PN2300-2554	PT3701-4899	RL
BC	GR	PC901-986	PN2570-2859	PT5001-5395	RM
BD	GT	PC1001-1984	PN2860-3030	PT5400-5547	RS
BF1-1000	GV1-198	PC2001-3761	PN3035	PT5555-5880	RT
BF1001-1400	GV201-553	PC3801-3976	PN3151-3191	PT5881	RV
BF1401-1999	GV557-1197	PC4001-4977	PN3195-3300	PT5885-5980	RX
BH	GV1200-1570	PC5001-5498	PN3311-3503	PT6000-6471	RZ
BJ1-1800	GV1580-1799	PD1-777	PN4001-4355	PT6500-6590	SI-760
BJ1801-2195	GV1800-1860	PD1001-1350	PN4390-4500	PT6592	S900-972
BL	H	PD1501-7159	PN4699-5650	PT7001-7099	SB
BM	HA	PE	PN6010-6078	PT7101-7599	SD
BP	HB	PF1-979	PN6080-6095	PT7601-8260	SF
BR	HC	PF1001-1184	PN6099-6120	PT8301-9155	SH
BS	HD1-100	PF1401-1558	PN6121-6146	PT9201-9999	SK
BT	HD101-1395	PF3001-5999	PN6147-6231	PZ1-4	T
BV	HD1401-2210	PG1-489	PN6233-6381	PZ5-10	TA
BX1-799	HD2321-4730	PG500-585	PN6400-6525	PZ11-99	TC
BX800-4795	HD4801-8942	PG601-799	PQ1-841	Q	TD
BX4800-9999	HE	PG801-1158	PQ1100-1297	QA1-99	TE
C	HF1-4050	PG1161-1164	PQ1300-1595	QA101-145	TF
CB	HF5001-6351	PG1171-1798	PQ1600-1709	QA150-299	TG
CC	HG	PG1801-1998	PQ1710-1935	QA300-433	TH
CD	HJ	PG2900-3155	PQ1947-2147	QA440-699	TJ
CE	HM	PG3200-3299	PQ2149-2551	QA801-939	TK
CJ	HN	PG3300-3490	PQ2600-2651	QB	TL
CN	HQ	PG3500-3560	PQ2660-2686	QC1-75	TN
CR	HS	PG3801-3998	PQ3800-3999	QC81-119	TP
CS	HT	PG4001-5198	PQ4001-4263	QC120-168	TR
CT	HV	PG5201-5598	PQ4265-4556	QC170-220	TS
D1-900	HX	PG5631-5698	PQ4561-4664	QC221-246	TT
D901-1075	J	PG6001-7498	PQ4675-4734	QC251-338	TX
DA	JA	PG7900-7948	PQ4800-4886	QC350-496	U
DB	JC	PG8001-9268	PQ5901-5999	QC501-798	UA
DC	JF	PG9501-9678	PQ6001-6269	QC801-999	UB
DD	JK	PH1-79	PQ6271-6498	AD1-69	UC
DE	JL	PH91-498	PQ6500-6576	AD71-145	UD
DF	JN	PH501-1109	PQ6600-6647	QD146-199	UE
DG	JQ	PH1201-3718	PQ6651-6676	QD241-449	UF
DH	JS	PH5001-5490	PQ7000-7079	QD450-731	UG
DJ	JV1-5399	PJ1-995	PQ7080-7087	QD901-999	UH
DK	JV6001-9500	PJ1001-1989	PQ7100-7349	QE	V
DL	JX	PJ2001-2199	PQ7361-7539	QH1-199	VA
DP1-500	K-KE	PJ2301-2551	PQ7551-8560	QH201-278	VB
DP501-900	KF	PJ3001-4091	PQ8600-8929	QH301-705	VC
DQ	KFA-KFW	PJ4101-5809	PQ9000-9189	QK1-474	VD
DR	KFX	PJ5901-9288	PQ9191-9255	QK475-989	VE
DS1-40	L	PK1-90	PQ9261-9288	QL1-355	VF
DS41-329	LA	PK101-2891	PQ9400-9479	QL362-739	VG
DS330-500	LB	PK2901-5534	PQ9500-9696	QL750-991	VK
DS501-935	LC	PK6001-6599	PQ9697-9699	QM	VM
DT	LD	PK6701-6996	PQ9990-9999	QP1-348	Z4-15
DU	LE	PK7001-9601	PR1-78	QP351-499	Z40-115
DX	LF	PL1-489	PR81-151	QP501-801	Z116-550
E1-139	LG	PL490-495	PR161-479	QP901-981	Z551-661
E140-200	LH	PL501-898	PR500-978	QR	Z662-1000
E201-299	LJ	PL901-998	PR1098-1395	R1-130	Z101-1121
E301-440	LT	PL1001-3299	PR1490-1799	R131-687	Z1201-1212
E441-655	M1-4	PL3301-3505	PR1803-2165	R690-899	Z1215-1361
E656-859	M5-1490	PL3521-4587	PR2199-2405	RA3-420	Z1365-1401
F1-205	M1495-5000	PL4601-4961	PR2411-2416	RA421-790	Z1411-1945
F206-475	ML	PL5001-7101	PR2417-2749	RA791-955	Z2000-2959
F476-705	MT	PL7501-7893	PR2750-3112	RA960-998	Z3001-4980
F721-854	N	PL8000-8844	PR3135-3198	RA1001-1171	Z5051-5055
F856-975	NA	PM1-95	PR3291-3785	RA1190-1270	Z5056-8999
F1000-1170	NB	PM101-7356	PR3991-5990	RB	
F1201-1392	NC	PM7801-7895	PR6000-6049	RC1-106	
F1401-1419	ND	PM8001-9021	PR6050-6076	RC110-253	
F1421-1577	NE	PN1-44	PR8309-9899	RC254-298	
F1601-2151	NK	PN45-75	PS1-478	RC306-320	

ANTHROPOLOGY

Level 1

- B-BZ Philosophy and Religion
- C History: Auxiliary Sciences
- E-F History: America
- G Geography, Anthropology, Recreation
- H Social Sciences
- L Education
- Q Science
- Z Bibliography and Library Science

Level 2

B-BZ Philosophy and Religion

- BF 730-738 Genetic psychology
- BF 431 Mental efficiency, ability, etc.
Intelligence, mental tests and testing.
- BL 256 Ethnology, anthropology

C. History: Auxiliary Sciences

- CC Archeology
- CB 57 History of Civilization and culture

E-F History: America

- E 169.12 1914 - Civilization. Intellectual life.
- E 184.A1 Elements in the population. General works.

G Geography, Anthropology, Recreation

- GF Human Ecology, Anthropogeography
- GN Anthropology
- GT Manners and Customs
- GR 880 Folklore relating to medicine

H Social Sciences

- HM 37 Relation to anthropology
- HM 101-108 Civilization

L Education

- LB 40-49 Theory and practice of education
- LB 189 Theory and practice of education
- LB 189 Education and social philosophy

Q Science

- QH 366.2 Natural History: 1970
- QP 351 Neurophysiology and Neuropsychology: periodicals

Z Bibliography and Library Sciences

- Z 5111-5119 Anthropology and ethnology. Individual tribes
in Z1201-5000, national bibliography

LINGUISTICS

Level 1

L-LZ	Education
P-PZ	Language and Literature
Z	Bibliography and Library Science

Level 2

<u>L-LZ Education</u>		PE English
LB 1139.L3 Language, speech development, vocabulary		PF West Germanic
<u>P-PZ Language and Literature +</u>		PG Slavic, Baltic, Albanian languages and literature
P Philology and linguistics (general)		PH Finno-Ugrian, Basque languages and literature
++ PA Classical languages and literature		++ PJ Oriental languages and literature
++ PB Modern European languages		++ PK Indo-Iranian
PC Romance languages		++ PL Languages and literature of Eastern Asia, Africa, Oceania
PD Germanic languages		PM American Indian languages. Artificial languages
		<u>Z Bibliography and Library Science</u>
		Z 7001-7123 Philology and linguistics

Level 3

<u>PA Classical Languages and Literature</u>		PJ 1001-1439 Egyptian
PA 1-2915 Classical Philology		PJ 2001-2187 Coptic
<u>PB Modern European Languages</u>		PJ 2301-3095 Hamitic languages
PB 1-1095 General Celtic		PJ 3101-3591 Assyrian
PB 1101-1195 Goidelic, Gaelic, Language		PJ 4001-4041 Sumerian
PB 1201-1299 Irish language		PJ 4101-5119 West and North Semitic languages
PB 1501-1599 Gaelic, Scottish Gaelic		PJ 5201-5494 Aramaic
PB 1801-1847 Manx language		PJ 6005-7134 Arabic
PB 1950 Pict		PJ 9001-9087 Ethiopian languages
PB 2001-2029 Brythonic group		PJ 9111-9250 Tigrina dialect
PB 2101-2199 Welsh, Cymric.		<u>PK Oriental. Indo-Iranian</u>
PB 2501-2549 Cornish language		PK 1-2891 Indo-Iranian
PB 2801-2849 Breton, Armorican languages		<u>PL Languages and literatures of Eastern Asia, Africa, Oceania</u>
PB 3001-3029 Gaulish language		PL 1-699 Languages of Eastern Asia
<u>PG Slavic, Balto-Slavic, Albanian Languages and Literature</u>		PL 901-949 Korean language and literature
PG 1-2850 Slavic		PL 1001-2239 Chinese language and literature
PG 3801-9598 Russian, Baltic, Albanian		PL 3301-3651 Non-Chinese languages of China
<u>PJ Oriental Languages and Literature</u>		PL 3781-3969 Himalayan languages
PJ 1-187 General works		PL 4001-4890 Minor languages and dialects, A-Z
		PL 5001-5129 Oceanic languages and literature
		PL 5151-5169 Javanese and Kawi
		PL 5191-8844 Oceanic, African Languages and Literature

GEOLOGY/EARTH SCIENCE

Level 1

BL-BX	Religion
G	Geography, Anthropology, Recreation
H	Social Sciences
L	Education
Q	Science
S	Agriculture
T	Technology
U	Military Science
V	Naval Science
Z	Bibliography and Library Science

Level 2

BL-BX Religion

BL 259	Geology
BS 651	General works
BS 657	Geology

G Geography, Anthropology, Folklore, etc.

GB all	Physical Geography
GC all	Oceanography
GF 71	Climatic influences

H Social Sciences

HD 9682	Mechanical industries
---------	-----------------------

L Education

LB 1655	Geology
---------	---------

Q Science

QB all	Astronomy
QC 798.D3	Dating
QC 801-999	Geophysics, cosmic physics
QE all	Geology

S Agriculture

S 590-599	Soils
S 600	Crops and Climate
S 622-627	Soils

T Technology

TA 705-713	Metal construction
TC 542	Surveying
TC 556-558	Dams, Barrages
TC 801.U2	Irrigation engineering; Reclamation of wasteland
TL 798.G4	Geodetic Satellites, periodicals, societies, etc.
TN 1-214	Mining engineering. Metallurgy
TN 260-end	Economic or applied geology and mineralogy

U Military Science

UG 465	Attack and Defense. Seige Warfare
--------	-----------------------------------

V Naval Science

V 396-396.5	Naval Research
VK 594	Apparatus. Instruments
VM 453	Freight vessels

Z Bibliography and Library Science

Z 695.1	Science and technology; cataloging
Z 697.G35	Classification and notation
Z 697.G42	Classification and notation
Z 697.H9	Classification and notation
Z 697.M5	Classification and notation
Z 697.O2	Classification and notation
Z 699.5	Mechanized methods of information storage and retrieval
Z 5853.E2	Engineering. Special topics
Z 6000	Geodesy
Z 6004.P5	Physical geography
Z 6004.P6	Oceanography
Z 6026.G3	Geological maps
Z 6031-6035	Geology. Mineralogy. Paleontology
Z 6040	Geophysics
Z 6681-6685	Meteorology. Terrestrial magnetism
Z 7401.G83	Science
Z 7935	Water supply. Ground water

INDUSTRIAL ARTS

Level 1

Industrial Arts Technology

Industrial Arts Education

Level 2

Industrial Arts Technology +

++ General Technology
 ++ Transportation
 ++ Manufacturing
 ++ Construction
 ++ Power
 ++ Ceramics
 ++ Design
 ++ Drafting
 ++ Electricity and Electronics
 ++ Graphic Arts
 ++ Metals
 ++ Plastics
 ++ Woods

Industrial Arts Education

T	61-173	Technical Education
TT	161-176	Industrial Arts Training
LB	1594-1599	Elementary Industrial Arts
LC	1041-1048	Vocational Education
LC	1081	Industrial Education
LC	2780.5	Industrial Education of Negroes

Level 3

General Technology

T	10-55	History of Technology
T	173-174	Technological Change
T	175-178	Industrial Research
TD	170-195	Environmental Pollution
TT	1-160	Handicrafts
CB	478	History of Technology and Civilization
HV	675-677	Safety Education

Transportation

TA	1015-1147	History and Popular Works on Transportation
TF	15-20	History of Railroad Engineering
HE	5614-5615	Automobile Safety
HE	1-192	General Transportation
HE	369-373	Traffic Surveys & Regulations

Manufacturing

TS	1-199	Manufacturing
----	-------	---------------

Construction

TA	401-495	Materials of Engineering & Construction
TA	630-705	Structural Engineering
TH	1-9745	Building Construction

Power

TJ	15-20	Mechanical Engineering History
TJ	144-267	General Mechanical Engineering
TJ	268-567	Steam Engineering
TJ	751-830	Miscellaneous Motors & Engines
TJ	840-935	Hydraulic Engineering
TJ	950-1030	Pneumatic Machinery
TJ	1040-1119	Other Machinery
TJ	1350-1418	Hoisting Machinery
TJ	1425-1475	Lifting & Pressing Machinery
TL	1-480	Automotive Engineering
TL	500-4050	Aeronautics & Astronautics

Ceramics

TP	785-888	Ceramics & Glass
NK	3700-4695	Ceramics
NK	5100-5199	Glass

Design

T	351-385	Mechanical Drawing
NA	2700-2725	Architectural Drafting
NC	749-757	Perspective
QA	501-507	Descriptive Geometry

Electricity & Electronics

QC	501-561	Electricity
TK	1-159	General Electrical Engineering
TK	165-171	Study & Teaching of Electrical Engineering
TK	301-351	Electric Meters
TK	452-541	Electric Apparatus & Materials
TK	1001-1194	Production of Electric Power
TK	2000-2970	Dynamic Electricity
TK	3001-3511	Distribution of Electric Power
TK	6540-6571	Radio
TK	6630-6720	Television
TK	7018-7725	Electrical Appliances
TK	7800-8360	Electronics
TK	9900-9971	Electricity for Amateurs

Graphic Arts

TP	946-949	Ink
TR	1-1045	Photography
Z	116-265	Printing
Z	551-661	Copyright
NE	400-978	Printmaking & Engraving
NE	1000-1372	Wood Engraving
NE	1400-1879	Metal Engraving
NE	2236-2240	Serigraphy
NE	2242 2246	Monotype
NE	2250-2890	Lithography
NK	3600-3639	Alphabets

Metals

TN	600-799	Metallurgy
TS	200-788	Metalworking
TT	205-297	Metalworking
TJ	1125-1345	Machine-shops

Plastics

TP	1101-1185	Plastics
TS	1870-1935	Rubber Industry
NK	8595-8596	Plastics

Woods

TP	934-944	Paint Industry
TS	800-937	Wood Technology
TS	1080-1268	Paper Industry
TT	180-223	Woodworking
TT	300-382	Painting
NK	9600-9799	Woodwork & Carving
SD	430-433	Exploitation of Lumber
SD	424-541	Timber Trees

AMERICAN PHILOSOPHY AND RELIGION (AMERICAN STUDIES)

Level 1

B-BJ	Philosophy
BL-BX	Religion
D	History: General and Old World
E-F	History: America
G	Geography, Anthropology, Folklore, etc.
H	Social Sciences
J	Political Sciences
K	Law
L	Education
M	Music
N	Fine Arts
P	Philology and Literature
R	Medicine
S	Agriculture, etc.
T	Technology
U	Military Science
V	Naval Science
Z	Bibliography and Library Science

Level 2

B-BJ Philosophy

B	29.E8	Minor philosophy collections
B	851.945	English
BC	50.D42	Theory. Nature. Scope. Relations
BC	50.D43	Theory. Nature. Scope. Relations
BD	161.D4	Epistemology 1801-
BF	131.D5	Compends. Manuals. later works, 1851-
BF	1573-1578	Witchcraft
BH	221.U5-U54	Aesthetics. By country
BJ	351-354	United States
BJ	1025.D53	1801-
BJ	1850-1859	American. Social usages. Etiquette

BL-BX Religion +

- ++ BL Religions, Mythology. Rationalism
- ++ BM Judaism
- ++ BP Islam. Bahaism. Theosophy, etc.
- ++ BR Christianity.
- ++ BV Practical Theology.
- ++ BX Denominations and Sects.

D History: General and Old World

D	570-576	Military operations
D	769	United States
D	773-774	Naval operations

E-F History: America

E-EZ	History: America
F 1-970	Local history by regions and states

G Geography, Anthropology, Folklore, etc.

G	3	United States Societies
G	470	America and Europe
G	480	America and Asia
G	1200-1534	United States atlases
G	3700-4383	United States maps
GB	121-124	United States physical geography
GN	784	United States prehistoric archeology
GR	100-133	Folklore by country
GT	205-219	Manners and customs in United States

- GT 605-617 Dress. Costume. United States
 GT 2703-2711 United States customs related to private life
 GT 3803-3811 Customs relative to public and social life
 GT 4003-4011 Processions. By country.
 GT 4203-4211 Carnivals. By country
 GT 4403-4411 Harvest Festivals. By country.
 GT 4603-4611 Fairs. By country.
 GT 4975 Thanksgiving Day
 GV 581-584.5 American sports
 GV 862-875 Baseball
 GV 951-959 Football
 GV 1017.A5 Other ball games
 GV 1024 United States automobiling
 GV 1125 United States fighting sports

H Social Sciences

- HC 101-109 United States
 HD 171-83 Periodicals. Documents
 HD 2766-67 Corporations
 HD 2771-2798 By country. United States
 HE 393-399 Waterways
 HE 2701-2791 Railways by country
 HE 6300-6599 Postal Service. By country
 HE 8801-8859 Telephone. By country
 HF 1225-1275 Commercial law by country
 HF 3001-3163 Commerce. By country. United States
 HG 451-649 By country. United States. Mint.
 HG 2401-2626 Banking. By country. United States
 HG 5001-5150 Industrial securities
 HG 8501-8549 Insurance. By country. United States
 HG 894-8963 Compulsory insurance by country. United States
 HJ 9-11 Documents Public Finance
 HJ 241-789 History. By country
 HJ 2360-2442 By country. General works, history, etc.
 law, legislation administration
 HJ 3251-3361 By country. United States. Serial documents
 HJ 4651-4655 Taxation by country. United States
 HJ 6075-6090 Tariffs by country. United States
 HJ 6620-6740 Customs Administration by country. United States
 HJ 7531-7534 Expenditure
 HJ 9141-9343 Local Finance
 HN 50-85 Social problems. Social reform.
 HQ 1402-1439 Women. Feminism
 HT 1048-1050 Slavery
 HV 85-100 State regulation of charities. Public welfare laws
 HV 741-743 Children, protection, assistance and relief
 HV 5285-5299 Alcoholism. Intemperance. Temperance reform.
 HV 5825-5839 Tobacco habit
 HV 7245-7300 Penology
 HV 7561-7625 Police. Detectives. Constabulary
 HV 8311-8394 Prisons. Penitentiaries. Documents

J Political Sciences

- J 11-99 Congress
 JV 1409-1419 Colonizing nations
 JS 3 United States local government
 JS 13 United States, cities, towns, etc. A-Z
 JS 301-1583 Local and municipal government
 JV 6403-7127 Manuals, guides for immigrants
 JX 1987 Arbitration treaties. United States

K Law

- KF Law of United States

L Education

- LA 201-396 History of higher education
 LD Individual institutions
 LE 3-78 Canada's universities and colleges
 LH 1 United States college and school magazines and papers
 LB 1201-1238 Methods of education

- LB 1561-63 Elementary or common school education by state and by city
 LB 1771-72 Education and training of teachers.
 General works and United States. By state.
 LB 1805-1987 State teachers colleges, normal schools. Teachers institutes
 LB 2154 United States. General works. By city.
 LB 2160 United States. General. By state. By city.
 LB 2514-2530 School laws and legislation
 LB 2801-2830 School administration and organization
 LB 2848-2851 Teaching personnel
 LB 3051-3053 Examinations and marking
 LC 89-90 Popular education
 LC 92 Other American countries
 LC 111-113 Public school question. Secularization. Religious instruction in the public schools
 LC 171-175 Higher education and the state
 LC 1751-59 United States education of women
 LC 3981-83 Education of exceptional children
 LC 4031-33 Education of defective children
 LC 5251-53 Adult education
 LT 23 United States textbooks

M Music

- M 1626-1677 Secular vocal music
 M 1945-1960 Student's songs
 ML 711 Piano: U.S. History and Criticism
 ML 811 String Instruments: U.S. History and Criticism
 ML 1111 Chamber music: U.S. History and Criticism
 ML 1211 Orchestral music: U.S. History and Criticism
 ML 1311 Band (military music): U.S. History and Criticism
 ML 1411 Vocal Music: U.S. History and Criticism
 ML 1511 Choral music: U.S. History and Criticism
 ML 1611 Secular vocal music: U.S. History and Criticism
 ML 1711 Dramatic Music: U.S. History and Criticism
 ML 2511 Songs (part and solo) U.S. History and Criticism
 ML 2611 Part songs: U.S. History and Criticism
 ML 2811 Solo songs: U.S. History and Criticism
 ML 2911 Sacred vocal music: U.S. History and Criticism
 ML 3011 Religious and Denominational: U.S. History and Criticism
 ML 3111 Sacred vocal music (Protestant): U.S. History and Criticism
 ML 3211 Oratorio: U.S. History and Criticism
 ML 3311 Program music: U.S. History and Criticism
 ML 3411 Dance music: U.S. History and Criticism
 ML 3556 Afro-American music: U.S. History and Criticism

N Fine Arts

- N 701-737 Art museums, galleries, etc.
 N 510-870 Art museums, galleries, etc.
 N 7593 General works
 N 8388-8384 Art as a profession
 NA 11 American architecture
 NA 2300-2305 Special schools
 NA 2605-2610 General, folios
 NA 6150-6152 General works by state. By city.
 NA 6830 General works
 NA 7127-7130 General, folios
 NA 7511 City houses
 NA 7561 Country homes - United States
 NA 7571 Suburban homes - United States
 NA 7586-87 United States
 NA 7610-7615 Special classes of building
 NA 9405-9410 Ornamental structures
 NB 237.52 Special countries sculpture
 NB 1132 Study and teaching of sculpture
 NC 1420-1429 Caricature, Pictorial humor and satire
 ND 1242-1245 Art treasures of special countries
 NC 1351 Landscape painting. United States
 ND 1731-32 United States. By city and museum or other place of exhibition
 ND 2895 United States. By city and institution, A-Z

American Philosophy and Religion (American Studies) - continued

NE 260 General printmaking and engraving
 NE 810 American 18th century
 NE 1210 American 18th century-special artists
 NK 11 American yearbooks, societies
 NK 410 United States. By city and school, A-Z
 California. Graduate School of Design,
 Pasadena
 NK 1141 United States arts and crafts
 NK 2000-2003 Interior decoration. House decoration
 NK 2406 Special countries - furniture
 NK 2812 United States - furniture
 NK 4712 United States arts and art industries
 NK 7412 United States history

P Philology and Literature

PE 2801-3101 English in foreign parts (general)
 PM 8077 Artificial languages. Universal languages
 PN 6157-6162 Wit and humor. Satire

R Medicine

R 151-363 History by country or region
 R 745-747 Medical education. Medical schools
 RA 407.3-407.4 Medical statistics United States
 RA 445-448.5 Public health. Hygiene. Preventive medicine
 by country
 RA 633.U5 Cremation history
 RA 664-667 Quarantine
 RA 790.7 Mental hygiene by country, A-Z
 RA 804-807 Medical climatology by country or region
 RA 981-982 Medical centers. Hospitals, Dispensaries.
 Clinics by country
 RA 1022.U5 Forensic medicine. Medical jurisprudence.
 Legal medicine. By country.
 RC 138.5 Diphtheria - United States
 RC 150.5 Influenza. Grippe. United States
 RC 154.5 Leprosy. Hansen's disease. United States
 RC 161 Malaria. United States.
 RC 176 Plague. Bubonic plague. Black death
 RC 181.U5-6 Poliomyelitis by country A-Z
 RC 183.5 Smallpox. United States
 RC 192 Typhoid fever. United States
 RC 199.5 Typhus. United States
 RC 201.3 Syphilis. United States
 RC 211 Yellow fever. United States
 RC 276-277 Cancer and other malignant neoplasms.
 United States
 RC 309.A5-Z Tuberculosis. United States
 RC 313 Tuberculosis. United States
 RC 443-445 Psychiatry. Psychopathology. United
 States
 RC 1054.U5 Aviation medicine. By country A-Z
 RD 200-214 Military and naval surgery. United States
 RE 30.U5 Government documents on ophthalmology
 and optometry. By country
 RF 26.U5 Otorhinolaryngology. By country A-Z
 RG 67.U5 Gynecology and obstetrics history

RG 143 Study and teaching. United States
 RG 960-962 Maternal care. United States
 RG 975-981 Maternal care. United States
 RJ 42.U5 Pediatrics history
 RK 34.U5-U52 Dentistry by country
 RK 91-97 Study and teaching
 RM 273.U5 Serum therapy. Immunotherapy. By country
 RM 285.U5 Endocrinotherapy. Organotherapy. By country
 A-Z
 RS 67.U5 Pharmacy and Materia Medica. By country
 RS 110-111 Study and teaching
 RS 171-172 Geographical distribution. Natural sources
 United States
 RT 4-5 Nursing. United States
 RT 34.Y7 Collective
 RV 100-101 Eclectic Medicine. Study and Teaching. Schools
 RX 101.U5 Homeopathy. Schools. By place A-Z

S Agriculture, etc.

S 1 American Agriculture
 S 21-132 Documents and other collections
 S 533-34 Agricultural education
 S 497-507 Handbooks, etc.
 S 751 Farm machinery and farm engineering. United
 States
 SB 19-21 Plant culture and horticulture documents
 SD 11-12 United States forestry
 SD 143-44 History of forestry. Forest conditions.
 SD 252-53 Study and teaching
 SD 426-29 Forest reserves
 SF 57-58 Animal culture law. Regulation. United States

T Technology

TX 703 Cookbooks. American. Canadian
 TX 715 American. Canadian. Hawaiian, French,
 German, etc. cookbooks published in America
 TX 721 German. Austrian. Including Pennsylvania-
 Dutch cookbooks
 TX 724.5 Oriental cookbook

U Military Science

U 408-439 Military education and training
 U 727 United States-Civil War (1861-1865)
 U 818 History of arms and armor. United States
 UA 22-585 Armies. Organization. Distribution
 Military situation
 UB 271.A Espionage
 UB 343-344 Compulsory service. Conscription and Exemption
 UB 380-414.5 Soldier's and sailor's homes
 UB 500-504 Military law

V Naval Science

VA 50-390 Naval situation, organization, etc. By country.
 United States

Z Bibliography and Library Science

A 1215-1361 America

Level 3

BL Religions. Mythology. Rationalism.

BL 2760 United States

BM Judaism

BM 60 United States
BM 75-80 Study and teaching
BM 90 American (United States), A-Z
BM 205-225 History

BP Islam. Bahaism. Theosophy, etc.

BP 43.U5 Individual countries, A-Z

BR Christianity

BR 513-569 United States

BV Practical Theology

BV 2300.C35 Catholic Foreign Mission Society of America. Maryknoll Fathers

BX Denominations and Sects

BX 497 Divisions of the Russian Church
BX 730-739 Orthodox Church in other countries. United States
BX 809.S6 Societies. Confraternities. General works. United States
BX 810 Local societies. United States
BX 833 United States Plenary Councils. National Councils.
BX 905 By country. Education of the clergy and of religious men and women
BX 908 By state A-W. Education of the clergy and of religious men and women
BX 915 By seminary, college. United States education
BX 932 United States education of the laity
BX 1404-1418 Periodicals. Societies. Congresses by region
BX 1760.A6 Periodicals. Societies. Controversial works against the Roman Catholics
BX 1770 By country. Controversial works against the Roman Catholics
BX 1932.U5 By place, A-Z rules and ordinances for the clergy
BX 1937.U6 General. By country. Canon law
BX 1937.U7 By diocese A-Z Canon law
BX 1977.U5 By country A-Z Forms of worship. Roman Catholic practice Liturgy and ritual
BX 2348.Z6 United states. Catholic Action
BX 2505-2525 General works. By region. Monasticism. Religious orders.

BX 4220.U5 General works. Religious orders of women
BX 4600-4603 United States churches, cathedrals, abbeys
BX 4659.U5 Biography and portraits. Collective. By country. Lives of saints and martyrs.
BX 4665.U5 By country A-Z. Lives of cardinals
BX 4781 United States individual churches. By place
BX 4795.L5 Lithuanian National Catholic Church of America
BX 4795.P6-68 Polish National Catholic Church of America
BX 4827.T53 Paul Tillich
BX 5800-5995 Protestant Episcopal Church in the United States
BX 6066-6088 By country history of reformed Episcopal church
BX 6081 Individual churches. United States
BX 6235-6249 By country. History of Baptists
BX 6931-7149 History of Christian Science in United States
BX 7260.E3 Jonathan Edwards 1703-1758
BX 7451-7493 Evangelical and reformed church
BX 7635-7649 By country. History Friends. Society of friends. Quakers.
BX 7780 United States. Individual meeting houses
BX 8041-8061 United States history Lutheran churches
BX 8076 United States individual churches
BX 8116-8118 History of Mennonites
BX 8131 United States individual branches of Mennonites
BX 8235-8249 United States
BX 8380-8389 Methodist Church (United States) Methodist Episcopal Church
BX 8525.7 General and United States History of Millennial Pawnists. Jehovah's Witnesses.
BX 8566-8568 United States History of Moravian Church. United Brethren. Unitas Fratrum. Herrnhuters
BX 8611 General works. Mormons
BX 8685 United States. Mormons.
BX 8693-8695 Collective. Individual, A-Z
BX 8716-8718 History. New Jerusalem Church. New Church
BX 8935-8999 History. Presbyterianism
BX 9458.U5 United States. Huguenots
BX 9495-9498 History of reformed or Calvinistic churches
BX 9701-9743 Salvation Army
BX 9766-9768 By country. Shakers. United Society of Believers. Millennial Church
BX 9833 By country. Unitarianism
BX 9875 United Brethren in Christ
BX 9933 United States. Universalism. Universalists

Appendix 4 SAMPLE REPORTS

It would be inappropriate to reproduce in this report all of the 2,000 pages of analyses that were generated during the project. Instead, two sets of samples are provided, one in this appendix and the other, more detailed, on microfiche. Examples of statistical summary reports and Overlap Analysis are not given in this appendix since they appear in the main body of the report, but they are included on the microfiche.

A. Sample Reports in this Appendix

1. Content Analysis	<u>Page</u>
a. total collection strength, OCLC/MARC tape data of four institutions	48
b. total collection strength, shelflist measurement data of four institutions	49
c. total collection strength, combined data (i.e. tape plus shelflist) of four institutions	50
d. specific L.C. class, OCLC/MARC tape data of four institutions	51
2. Component Analysis	
a. all components of Industrial Arts, OCLC/MARC tape data of a single institution (SUNY Oswego)	52
b. all components of Anthropology, OCLC/MARC tape data of four institutions	64

N.B. All of the examples except 2a use data from the four advisory institutions, and are arrayed by library and institution. Example 2a shows an alternate report format which arrays the data by discipline component. The first format allows comparison of the strengths of a set of libraries in one discipline, while the second allows comparison of the strengths of a set of disciplines in one library or institution. Either format is available for either Content or Component Analysis of the collections of a group of libraries.

WITHIN 1. TOTAL: A-Z BOOKS IN L C CLASSIFICATIONS

INSTITUTION / HOLDING LIBRARY	NUMBER OF TITLES	PERCENT OF CLASS	RANK IN CLASS	PERCENT OVERALL	RANK OVERALL
FOUR INSTITUTIONS	25,117.00	100.00	-	100.00	1
BINGHAMTON	7,522.00	29.94	2	29.94	3
CORNELL	12,538.00	49.91	1	49.91	2
CORTLAND	1,490.00	5.93	4	5.93	8
ONEONTA	3,567.00	14.20	3	14.20	6
BINGHAMTON	7,522.00	100.00	-	29.94	3
BNGF	595.00	7.37	3	2.20	14
BAGG	5,187.00	68.95	1	20.65	5
BNGH	2.00	0.02	13	0.00	49
BNGJ	19.00	0.25	7	0.07	36
BNGM	102.00	1.35	4	0.40	24
BNGN	16.00	0.21	5	0.06	38
BNGR	101.00	1.34	5	0.40	25
BNGS	1,470.00	19.54	2	5.85	9
BNGT	8.00	0.10	11	0.03	44
BNGU	27.00	0.35	6	0.10	32
BNGX	5.00	0.06	12	0.01	46
BNG3	15.00	0.25	7	0.07	36
BNG6	11.00	0.14	10	0.04	43
CORNELL	12,538.00	100.00	-	49.91	2
COU+	497.00	3.96	5	1.57	13
COU3	1.00	0.00	30	0.00	55
COU4	6.00	0.04	24	0.02	45
COU#	22.00	0.17	19	0.08	34
COU A	84.00	0.66	13	0.33	26
COU8	458.00	3.65	6	1.82	16
COU0	1.00	0.00	30	0.00	55
COU2	317.00	2.52	10	1.26	20
COUF	435.00	3.46	8	1.73	18
COUG	13.00	0.10	23	0.05	42
COUH	2.00	0.01	25	0.00	49
COU T	2.00	0.01	25	0.00	49
CCCL	451.00	3.59	7	1.75	17
COOM	387.00	3.08	9	1.54	19
CUCN	584.00	7.84	2	3.91	11
COCO	6,645.00	54.59	1	27.25	4
COUP	169.00	1.34	11	0.67	21
COU6	104.00	0.82	12	0.41	23
COUR	68.00	0.54	15	0.27	29
CCUS	2.00	0.01	25	0.00	49
COOT	21.00	0.16	20	0.08	35
COOU	476.00	5.39	4	2.65	13
CCU6	766.00	6.10	3	3.04	12
COOX	15.00	0.11	21	0.05	39
COOY	2.00	0.01	25	0.00	49
COO1	41.00	0.32	17	0.16	31
COO4	24.00	0.19	18	0.09	33
COO7	2.00	0.01	25	0.00	49
XJ. I	75.00	0.63	14	0.31	27
XCCP	49.00	0.39	16	0.19	30
XOUU	15.00	0.11	21	0.05	39
CORTLAND	1,490.00	100.00	-	5.93	8
YCM0	4.00	0.26	3	0.01	47
YCMH	1,405.00	94.56	1	5.60	10
YCMP	77.00	5.16	2	0.30	28
ONEONTA	3,567.00	100.00	-	14.20	6
ZBMC	1.00	0.02	5	0.00	55
ZBME	1.00	0.02	5	0.00	55
ZBMK	3.00	0.08	4	0.01	48
ZBMM	3,464.00	99.43	1	13.55	7
ZBMH	14.00	0.39	3	0.05	41
ZBMR	144.00	4.03	2	0.57	22

WITHIN 1. TOTAL: A-Z BOOKS IN L C CLASSIFICATIONS

INSTITUTION / HOLDING LIBRARY	NUMBER OF TITLES	PERCENT OF CLASS	RANK IN CLASS	PERCENT OVERALL	RANK OVERALL
FOUR INSTITUTIONS	2,444,677.00	100.00	-	100.00	1
BINGHAMTON	257,519.00	11.24	2	11.24	4
CORNELL	1,977,150.00	74.75	1	74.75	2
CORTLAND	164,775.00	6.23	4	6.23	8
ONEONTA	205,229.00	7.76	3	7.76	6
BINGHAMTON	257,519.00	100.00	-	11.24	4
BNG (BINGHAMTON SHELF LIST MEASUREMENT)	257,519.00	100.00	1	11.24	4
CORNELL	1,977,150.00	100.00	-	74.75	2
COG (CORNELL SHELF LIST MEASUREMENT)	1,977,150.00	100.00	1	74.75	2
CORTLAND	164,775.00	100.00	-	6.23	8
YCMH	156,659.00	95.07	1	5.92	9
YCHR	8,120.00	4.92	2	0.36	10
ONEONTA	205,229.00	100.00	-	7.76	6
ZBMM	199,003.00	96.96	1	7.52	7
ZBMR	6,226.00	3.03	2	0.23	11

WITHIN 1. TOTAL: A-Z BOOKS IN L C CLASSIFICATIONS

INSTITUTION / HOLDING LIBRARY	NUMBER OF TITLES	PERCENT OF CLASS	RANK IN CLASS	PERCENT OVERALL	RANK OVERALL
FOUR INSTITUTIONS	2,449,794.00	100.00	-	100.00	1
BINGHAMTON	305,641.00	11.42	2	11.42	4
CORNELL	1,989,688.00	74.52	1	74.52	2
CORTLAND	166,249.00	6.22	4	6.22	8
ONEONTA	208,796.00	7.82	3	7.82	6
BINGHAMTON	305,641.00	100.00	-	11.42	4
BNGF	555.00	0.18	4	0.02	18
BNGG	5,187.00	1.70	2	0.19	13
BNGH	2.00	0.00	14	0.00	51
BNGJ	19.00	0.00	8	0.00	38
BNGM	162.00	0.03	5	0.00	27
BNGN	16.00	0.00	10	0.00	40
BNGR	101.00	0.03	6	0.00	28
BNGS	1,470.00	0.48	3	0.05	14
BNGT	8.00	0.00	12	0.00	46
BNGU	27.00	0.00	7	0.00	34
BNGX	5.00	0.00	13	0.00	48
BNG3	19.00	0.00	8	0.00	38
BNG6	11.00	0.00	11	0.00	45
BNG (BINGHAMTON SHELF LIST MEASUREMENT)	297,519.00	97.53	1	11.14	5
CORNELL	1,989,688.00	100.00	-	74.52	2
COO+	497.00	0.02	6	0.01	19
COO8	1.00	0.00	31	0.00	57
COO*	6.00	0.00	25	0.00	47
COO#	22.00	0.00	20	0.00	36
COOA	84.00	0.00	14	0.00	29
COOB	458.00	0.02	7	0.01	20
COOD	1.00	0.00	31	0.00	57
COOE	317.00	0.01	11	0.01	24
COOF	435.00	0.02	9	0.01	22
COOG	13.00	0.00	24	0.00	44
COOH	2.00	0.00	26	0.00	51
COOI	2.00	0.00	26	0.00	51
COOL	451.00	0.02	8	0.01	21
COOM	387.00	0.01	10	0.01	23
COON	984.00	0.04	3	0.03	15
COOO	6,845.00	0.34	2	0.25	11
COOP	169.00	0.00	12	0.00	25
COOQ	104.00	0.00	13	0.00	26
COOR	68.00	0.00	16	0.00	31
COOS	2.00	0.00	26	0.00	51
COOT	21.00	0.00	21	0.00	37
COOU	676.00	0.03	5	0.02	17
COOV	766.00	0.03	4	0.02	16
COOY	15.00	0.00	22	0.00	41
COOZ	2.00	0.00	26	0.00	51
COU1	41.00	0.00	18	0.00	33
COU4	24.00	0.00	19	0.00	35
COU7	2.00	0.00	26	0.00	51
COU1	79.00	0.00	15	0.00	30
COUM	49.00	0.00	17	0.00	32
COUJ	15.00	0.00	22	0.00	41
COU (CORNELL SHELF LIST MEASUREMENT)	1,977,150.00	99.36	1	74.05	3
CORTLAND	166,249.00	100.00	-	6.22	8
YCMD	4.00	0.00	3	0.00	49
YCMH	158,668.00	55.06	1	5.92	9
YCMR	8,197.00	4.92	2	0.30	10
ONEONTA	208,796.00	100.00	-	7.82	6
ZBMC	1.00	0.00	5	0.00	57
ZBHI	1.00	0.00	5	0.00	57
ZBHK	3.00	0.00	4	0.00	50
ZBHM	262,407.00	96.94	1	7.58	7
ZBHN	14.00	0.00	3	0.00	43
ZBHR	6,270.00	3.05	2	0.23	12

WITHIN 1. PR2750-3112 SHAKESPEARE

INSTITUTION / HOLDING LIBRARY	NUMBER OF TITLES	PERCENT OF CLASS	RANK IN CLASS	PERCENT OVERALL	RANK OVERALL
FOUR INSTITUTIONS	45.00	100.00	-	100.00	1
BINGHAMTON	27.00	39.13	1	39.13	2
CORNELL	15.00	21.73	3	21.73	6
CORTLAND	4.00	5.79	4	5.79	8
CNECATA	23.00	33.33	2	33.33	4
BINGHAMTON	27.00	100.00	-	39.13	2
BNGG	25.00	52.59	1	36.23	3
BNGH	1.00	3.70	2	1.44	11
BNGJ	1.00	3.70	2	1.44	11
CORNELL	15.00	100.00	-	21.73	6
CCOU	11.00	73.33	1	15.94	7
CCOU	4.00	26.66	2	5.79	8
CORTLAND	4.00	100.00	-	5.79	8
YCRM	4.00	100.00	1	5.79	8
CNECATA	23.00	100.00	-	33.33	4
CBMP	23.00	100.00	1	33.33	4

DISCIPLINE COMPONENT	NUMBER OF TITLES	PERCENT OF CLASS	RANK IN CLASS	PERCENT OVERALL	RANK OVERALL
INDUSTRIAL ARTS	147.00	100.00	-	100.00	1
INDUSTRIAL ARTS TECHNOLOGY	135.00	91.83	1	91.83	2
INDUSTRIAL ARTS EDUCATION	12.00	8.16	2	8.16	9
INDUSTRIAL ARTS TECHNOLOGY	135.00	100.00	-	91.83	2
GENERAL TECHNOLOGY	9.00	6.66	8	6.12	19
TRANSPORTATION	3.00	2.22	12	2.04	32
MANUFACTURING	1.00	0.74	13	0.68	46
CONSTRUCTION	14.00	10.37	4	9.52	7
POWER	16.00	11.85	2	10.88	4
CERAMICS	10.00	7.40	7	6.80	11
DESIGN	5.00	3.70	10	3.40	22
DRAFTING	4.00	2.96	11	2.72	29
ELECTRICITY & ELECTRONICS	27.00	20.00	1	18.36	3
GRAPHIC ARTS	16.00	11.85	2	10.88	4
METALS	11.00	8.14	6	7.48	10
PLASTICS	8.00	5.92	9	5.44	17
WOODS	13.00	9.62	5	8.84	8
GENERAL TECHNOLOGY	9.00	100.00	-	6.12	19
TECHNOLOGICAL CHANGE	1.00	11.11	4	0.68	46
INDUSTRIAL RESEARCH	1.00	11.11	4	0.68	46
ENVIRONMENTAL POLLUTION	3.00	33.33	1	2.04	32
HANDICRAFTS	2.00	22.22	2	1.36	39
HISTORY OF TECHNOLOGY & CIVILIZATION	2.00	22.22	2	1.36	39
INDUSTRIAL ARTS EDUCATION	12.00	100.00	-	8.16	9
TECHNICAL EDUCATION	4.00	33.33	2	2.72	29
INDUSTRIAL ARTS TRAINING	3.00	25.00	3	2.04	32
VOCATIONAL EDUCATION	5.00	41.66	1	3.40	22
TRANSPORTATION	3.00	100.00	-	2.04	32
GENERAL TRANSPORTATION	3.00	100.00	1	2.04	32
MANUFACTURING	1.00	100.00	-	0.68	46
MANUFACTURING	1.00	100.00	1	0.68	46
CONSTRUCTION	14.00	100.00	-	9.52	7
MATERIALS OF ENGINEERING & CONSTRUCTION	5.00	35.71	2	3.40	22
STRUCTURAL ENGINEERING	1.00	7.14	3	0.68	46
BUILDING CONSTRUCTION	8.00	57.14	1	5.44	17
POWER	16.00	100.00	-	10.88	4
GENERAL MECHANICAL ENGINEERING	2.00	12.50	3	1.36	39
AUTOMOTIVE ENGINEERING	10.00	62.50	1	6.80	11
AERONAUTICS & ASTRONAUTICS	4.00	25.00	2	2.72	29
CERAMICS	10.00	100.00	-	6.80	11
CERAMICS & GLASS	10.00	100.00	1	6.80	11

DISCIPLINE- COMPONENT	NUMBER OF TITLES	PERCENT OF CLASS	RANK IN CLASS	PERCENT OVERALL	RANK OVERALL
DESIGN					
HISTORY OF ARCHITECTURE	5.00	100.00	-	3.40	22
ARCHITECTURAL DESIGN	4.00	80.00	1	2.72	25
	1.00	20.00	2	0.68	46
DRAFTING					
MECHANICAL DRAWING	4.00	100.00	-	2.72	25
	4.00	100.00	1	2.72	25
ELECTRICITY & ELECTRONICS					
ELECTRICITY	27.00	100.00	-	18.36	3
GENERAL ELECTRICAL ENGINEERING	1.00	3.70	5	0.68	46
DYNAMIC ELECTRICITY	1.00	3.70	5	0.68	46
DISTRIBUTION OF ELECTRIC POWER	1.00	3.70	5	0.68	46
TELEVISION	2.00	7.40	4	1.36	39
ELECTRONICS	3.00	11.11	2	2.04	32
ELECTRICITY FOR AMATEURS	16.00	59.25	1	10.88	4
	3.00	11.11	2	2.04	32
GRAPHIC ARTS					
PHOTOGRAPHY	16.00	100.00	-	10.88	4
PRINTING	9.00	56.25	1	6.12	15
PRINTMAKING & ENGRAVING	4.00	25.00	2	2.72	25
ALPHABETS	2.00	12.50	3	1.36	39
	1.00	6.25	4	0.68	46
METALS					
METALLURGY	11.00	100.00	-	7.48	10
METALWORKING	2.00	16.18	3	1.36	39
MACHINE-TOOLS	3.00	27.27	2	2.04	32
	6.00	54.54	1	4.08	21
PLASTICS					
PLASTICS (TP 1101 1105)	8.00	100.00	-	5.44	17
	8.00	100.00	1	5.44	17
WOODS					
PAINT INDUSTRY	13.00	100.00	-	8.84	8
WOOD TECHNOLOGY	1.00	7.69	2	0.68	46
WOODWORKING	1.00	7.69	2	0.68	46
PAINTING	10.00	76.92	1	6.80	11
	1.00	7.69	2	0.68	46
METALWORKING					
TT205-223	3.00	100.00	-	2.04	32
TT224-297	2.00	66.66	1	1.36	39
	1.00	33.33	2	0.68	46
WOODWORKING					
TT180-204	10.00	100.00	-	6.80	11
TT205-223	8.00	80.00	1	5.44	17
	2.00	20.00	2	1.36	39

WITHIN 1. ANTHROPOLOGY

INSTITUTION / HOLDING LIBRARY	NUMBER OF TITLES	PERCENT OF CLASS	RANK IN CLASS	PERCENT OVERALL	RANK OVERALL
FOUR INSTITUTIONS	319.00	100.00	-	100.00	1
BINGHAMTON	125.00	39.18	1	39.18	2
CORNELL	121.00	37.93	2	37.93	3
CORTLAND	27.00	8.46	4	8.46	8
ONEONTA	46.00	14.42	3	14.42	6
BINGHAMTON	125.00	100.00	-	39.18	2
BNGF	2.00	1.60	3	0.62	15
BNGG	116.00	92.80	1	36.36	4
BNGR	1.00	0.80	4	0.31	19
BNGS	6.00	4.80	2	1.88	13
CORNELL	121.00	100.00	-	37.93	3
COOA	2.00	1.65	6	0.62	15
COOE	1.00	0.82	8	0.31	19
COOF	1.00	0.82	8	0.31	19
COOL	2.00	1.65	6	0.62	15
COON	11.00	9.09	2	3.44	10
COOO	83.00	68.59	1	26.01	5
COOR	3.00	2.47	5	0.94	14
COOU	11.00	9.09	2	3.44	10
COOW	7.00	5.78	4	2.19	12
CORTLAND	27.00	100.00	-	8.46	8
YCHM	27.00	100.00	1	8.46	8
ONEONTA	46.00	100.00	-	14.42	6
ZBMM	44.00	95.65	1	13.79	7
ZBPR	2.00	4.34	2	0.62	15

WITHIN 1. B-81 PHILOSOPHY AND RELIGION

INSTITUTION / HOLDING LIBRARY	NUMBER OF TITLES	PERCENT OF CLASS	RANK IN CLASS	PERCENT OVERALL	RANK OVERALL
FOUR INSTITUTIONS	9.00	100.00	-	100.00	1
BINGHAMTON	1.00	11.11	3	11.11	6
CORNELL	3.00	33.33	2	33.33	4
CORTLAND	1.00	11.11	3	11.11	6
ONEONTA	4.00	44.44	1	44.44	2
BINGHAMTON	1.00	100.00	-	11.11	6
BNGS	1.00	100.00	1	11.11	6
CORNELL	3.00	100.00	-	33.33	4
COOL	1.00	33.33	2	11.11	6
COOO	2.00	66.66	1	22.22	5
CORTLAND	1.00	100.00	-	11.11	6
YCHM	1.00	100.00	1	11.11	6
ONEONTA	4.00	100.00	-	44.44	2
ZBMM	4.00	100.00	1	44.44	2

WITHIN 1. C HISTORY: AUXILIARY SCIENCES

INSTITUTION / HOLDING LIBRARY	NUMBER OF TITLES	PERCENT OF CLASS	RANK IN CLASS	PERCENT OVERALL	RANK OVERALL
FOUR INSTITUTIONS	17.00	100.00	-	100.00	1
BINGHAMTON	4.00	23.52	2	23.52	4
CORNELL	11.00	64.70	1	64.70	2
ONEONTA	2.00	11.76	3	11.76	6
BINGHAMTON	4.00	100.00	-	23.52	4
BNCG	4.00	100.00	1	23.52	4
CORNELL	11.00	100.00	-	64.70	2
COOO	9.00	81.81	1	52.94	3
COCU	2.00	18.18	2	11.76	6
ONEONTA	2.00	100.00	-	11.76	6
ZBMM	2.00	100.00	1	11.76	6

WITHIN 1. E-F HISTORY: AMERICA

INSTITUTION / HOLDING LIBRARY	NUMBER OF TITLES	PERCENT OF CLASS	RANK IN CLASS	PERCENT OVERALL	RANK OVERALL
FOUR INSTITUTIONS	19.00	100.00	-	100.00	1
BINGHAMTON	6.00	31.57	2	31.57	3
CORNELL	9.00	47.36	1	47.36	2
ONEONTA	4.00	21.05	3	21.05	6
BINGHAMTON	6.00	100.00	-	31.57	3
BNCG	6.00	100.00	1	31.57	3
CORNELL	9.00	100.00	-	47.36	2
COGA	1.00	11.11	2	5.26	8
COOL	1.00	11.11	2	5.26	8
COOC	5.00	55.55	1	26.31	5
COOR	1.00	11.11	2	5.26	8
COOU	1.00	11.11	2	5.26	8
ONEONTA	4.00	100.00	-	21.05	6
ZBMM	3.00	75.00	1	15.78	7
ZBMR	1.00	25.00	2	5.26	8

WITHIN 1. G GEOGRAPHY, ANTHROPOLOGY, RECREATION

INSTITUTION / HOLDING LIBRARY	NUMBER OF TITLES	PERCENT OF CLASS	RANK IN CLASS	PERCENT OVERALL	RANK OVERALL
FOUR INSTITUTIONS	248.00	100.00	-	100.00	1
BINGHAMTON	100.00	40.32	1	40.32	2
CORNELL	90.00	36.29	2	36.29	4
CORTLAND	23.00	9.27	4	9.27	8
ONEONTA	35.00	14.11	3	14.11	6
BINGHAMTON	100.00	100.00	-	40.32	2
BNGF	2.00	2.00	2	0.80	13
BNGG	95.00	95.00	1	38.30	3
BNGR	1.00	1.00	4	0.40	16
BNGS	2.00	2.00	2	0.80	13
CORNELL	90.00	100.00	-	36.29	4
COGA	1.00	1.11	6	0.40	16
COGE	1.00	1.11	6	0.40	16
COOF	1.00	1.11	6	0.40	16
COOM	7.00	7.77	2	2.82	10
COOD	65.00	72.22	1	26.20	5
COOR	2.00	2.22	5	0.80	13
COOU	7.00	7.77	2	2.82	10
COOW	6.00	6.66	4	2.41	12
CORTLAND	23.00	100.00	-	9.27	8
YCHM	23.00	100.00	1	9.27	8
ONEONTA	35.00	100.00	-	14.11	6
ZBMM	34.00	97.14	1	13.70	7
ZBMR	1.00	2.85	2	0.40	16

WITHIN 1. H SOCIAL SCIENCES

INSTITUTION / HOLDING LIBRARY	NUMBER OF TITLES	PERCENT OF CLASS	RANK IN CLASS	PERCENT OVERALL	RANK OVERALL
FOUR INSTITUTIONS	14.00	100.00	-	100.00	1
BINGHAMTON	8.00	57.14	1	57.14	2
CORNELL	4.00	28.57	2	28.57	4
CORTLAND	2.00	14.28	3	14.28	5
BINGHAMTON	8.00	100.00	-	57.14	2
BNGG	8.00	100.00	1	57.14	2
CORNELL	4.00	100.00	-	28.57	4
COOF	1.00	25.00	1	7.14	7
COOD	1.00	25.00	1	7.14	7
COOU	1.00	25.00	1	7.14	7
COOW	1.00	25.00	1	7.14	7
CORTLAND	2.00	100.00	-	14.28	5
YCHM	2.00	100.00	1	14.28	5

WITHIN 1. L

EDUCATION

INSTITUTION / HOLDING LIBRARY	NUMBER OF TITLES	PERCENT OF CLASS	RANK IN CLASS	PERCENT OVERALL	RANK OVERALL
FOUR INSTITUTIONS	4.00	100.00	-	100.00	1
BINGHAMTON	1.00	25.00	1	25.00	2
CORNELL	1.00	25.00	1	25.00	2
CORTLAND	1.00	25.00	1	25.00	2
ONE UNTA	1.00	25.00	1	25.00	2
BINGHAMTON	1.00	100.00	-	25.00	2
BNGG	4.00	100.00	1	25.00	2
CORNELL	1.00	100.00	-	25.00	2
COON	1.00	100.00	1	25.00	2
CORTLAND	1.00	100.00	-	25.00	2
YCHM	1.00	100.00	1	25.00	2
ONE UNTA	1.00	100.00	-	25.00	2
ZBHM	1.00	100.00	1	25.00	2

WITHIN 1. Q

SCIENCE

INSTITUTION / HOLDING LIBRARY	NUMBER OF TITLES	PERCENT OF CLASS	RANK IN CLASS	PERCENT OVERALL	RANK OVERALL
FOUR INSTITUTIONS	5.00	100.00	-	100.00	1
BINGHAMTON	3.00	60.00	1	60.00	2
CORNELL	2.00	40.00	2	40.00	4
BINGHAMTON	3.00	100.00	-	60.00	2
BNGS	3.00	100.00	1	60.00	2
CORNELL	2.00	100.00	-	40.00	4
COON	2.00	100.00	1	40.00	4

WITHIN 1. 2 BIBLIOGRAPHY AND LIBRARY SCIENCE

INSTITUTION / HOLDING LIBRARY	NUMBER OF TITLES	PERCENT OF CLASS	RANK IN CLASS	PERCENT OVERALL	RANK OVERALL
FOUR INSTITUTIONS	3.00	100.00	-	100.00	1
BINGHAMTON	2.00	66.66	1	66.66	2
CORNELL	1.00	33.33	2	33.33	4
BINGHAMTON	2.00	100.00	-	66.66	2
BNGG	2.00	100.00	1	66.66	2
CORNELL	1.00	100.00	-	33.33	4
COOU	1.00	100.00	1	33.33	4

WITHIN 1. OF 431 MENTAL EFFICIENCY, ABILITY, ETC.
INTELLIGENCE, MENTAL TESTS AND TESTING.

INSTITUTION / HOLDING LIBRARY	NUMBER OF TITLES	PERCENT OF CLASS	RANK IN CLASS	PERCENT OVERALL	RANK OVERALL
FOUR INSTITUTIONS	9.00	100.00	-	100.00	1
BINGHAMTON	1.00	11.11	3	11.11	6
CORNELL	3.00	33.33	2	33.33	4
CORTLAND	1.00	11.11	3	11.11	6
UNFONTA	4.00	44.44	1	44.44	2
BINGHAMTON	1.00	100.00	-	11.11	6
BNGG	1.00	100.00	1	11.11	6
CORNELL	3.00	100.00	-	33.33	4
COOL	1.00	33.33	2	11.11	6
COOU	2.00	66.66	1	22.22	5
CORTLAND	1.00	100.00	-	11.11	6
YCMH	1.00	100.00	1	11.11	6
UNFONTA	4.00	100.00	-	44.44	2
2BMM	4.00	100.00	1	44.44	2

WITHIN 1. CC ARCHEOLOGY

INSTITUTION / HOLDING LIBRARY	NUMBER OF TITLES	PERCENT OF CLASS	RANK IN CLASS	PERCENT OVERALL	RANK OVERALL
FOUR INSTITUTIONS	17.00	100.00	-	100.00	1
BINGHAMTON	4.00	23.52	2	23.52	4
CORNELL	11.00	64.70	1	64.70	2
ONEONTA	2.00	11.76	3	11.76	6
BINGHAMTON	4.00	100.00	-	23.52	4
BNGG	4.00	100.00	1	23.52	4
CORNELL	11.00	100.00	-	64.70	2
CODD	9.00	81.81	1	52.94	3
COU	2.00	18.18	2	11.76	6
ONEONTA	2.00	100.00	-	11.76	6
ZBMM	2.00	100.00	1	11.76	6

WITHIN 1. 169.12 1914-CIVILIZATION. INTELLECTUAL LIFE.

INSTITUTION / HOLDING LIBRARY	NUMBER OF TITLES	PERCENT OF CLASS	RANK IN CLASS	PERCENT OVERALL	RANK OVERALL
FOUR INSTITUTIONS	3.00	100.00	-	100.00	1
BINGHAMTON	1.00	33.33	2	33.33	4
CORNELL	2.00	66.66	1	66.66	2
BINGHAMTON	1.00	100.00	-	33.33	4
BNGG	1.00	100.00	1	33.33	4
CORNELL	2.00	100.00	-	66.66	2
CODD	2.00	100.00	1	66.66	2

WITHIN 1. E 184.A1 ELEMENTS IN THE POPULATION. GENERAL WORKS.

INSTITUTION / HOLDING LIBRARY	NUMBER OF TITLES	PERCENT OF CLASS	RANK IN CLASS	PERCENT OVERALL	RANK OVERALL
FOUR INSTITUTIONS	16.00	100.00	-	100.00	1
BINGHAMTON	5.00	31.25	2	31.25	3
CORNELL	7.00	43.75	1	43.75	2
ONEONTA	4.00	25.00	3	25.00	5
BINGHAMTON	5.00	100.00	-	31.25	3
UNGG	5.00	100.00	1	31.25	3
CORNELL	7.00	100.00	-	43.75	2
COCA	1.00	14.28	2	6.25	8
COOL	1.00	14.28	2	6.25	8
COOU	3.00	42.85	1	18.75	6
COUR	1.00	14.28	2	6.25	8
COUJ	1.00	14.28	2	6.25	8
ONEONTA	4.00	100.00	-	25.00	5
ZBMM	3.00	75.00	1	18.75	6
ZBMR	1.00	25.00	2	6.25	8

WITHIN 1. OF HUMAN ECOLOGY, ANTHROPOGEOGRAPHY

INSTITUTION / HOLDING LIBRARY	NUMBER OF TITLES	PERCENT OF CLASS	RANK IN CLASS	PERCENT OVERALL	RANK OVERALL
FOUR INSTITUTIONS	31.00	100.00	-	100.00	1
BINGHAMTON	7.00	22.58	3	22.58	5
CORNELL	11.00	35.48	1	35.48	2
CORTLAND	4.00	12.90	4	12.90	7
ONEONTA	9.00	29.03	2	29.03	3
BINGHAMTON	7.00	100.00	-	22.58	5
UNGG	7.00	100.00	1	22.58	5
CORNELL	11.00	100.00	-	35.46	2
COOE	1.00	9.09	3	3.22	11
COOF	1.00	9.09	3	3.22	11
COGN	3.00	27.27	2	9.67	10
COOU	4.00	36.36	1	12.90	7
COOU	1.00	9.09	3	3.22	11
COOW	1.00	9.09	3	3.22	11
CORTLAND	4.00	100.00	-	12.90	7
YCHM	4.00	100.00	1	12.90	7
ONEONTA	9.00	100.00	-	29.03	3
ZBMM	8.00	88.88	1	25.80	4
ZBMR	1.00	11.11	2	3.22	11

WITHIN 1. GN ANTHROPOLOGY

INSTITUTION / HOLDING LIBRARY	NUMBER OF TITLES	PERCENT OF CLASS	RANK IN CLASS	PERCENT OVERALL	RANK OVERALL
FOUR INSTITUTIONS	187.00	100.00	-	100.00	1
BINGHAMTON	84.00	44.91	1	44.91	2
CORNELL	68.00	36.36	2	36.36	4
CORTLAND	15.00	8.02	4	8.02	8
ONEONTA	20.00	10.69	3	10.69	6
BINGHAMTON	84.00	100.00	-	44.91	2
BNGG	81.00	96.42	1	43.31	3
BNGR	1.00	1.19	3	0.53	14
BNGS	2.00	2.38	2	1.06	12
CORNELL	68.00	100.00	-	36.36	4
COJA	1.00	1.47	5	0.53	14
COOP	2.00	2.94	4	1.06	12
COOC	55.00	80.88	1	29.41	5
COOR	1.00	1.47	5	0.53	14
COUJ	5.00	7.35	2	2.67	10
COUW	4.00	5.88	3	2.13	11
CORTLAND	15.00	100.00	-	8.02	8
YCHM	15.00	100.00	1	8.02	8
ONEONTA	20.00	100.00	-	10.69	6
	20.00	100.00	1	10.69	6

WITHIN 1. GI MANNERS AND CUSTOMS

INSTITUTION / HOLDING LIBRARY	NUMBER OF TITLES	PERCENT OF CLASS	RANK IN CLASS	PERCENT OVERALL	RANK OVERALL
FOUR INSTITUTIONS	28.00	100.00	-	100.00	1
BINGHAMTON	9.00	32.14	2	32.14	3
CORNELL	11.00	39.28	1	39.28	2
CORTLAND	3.00	10.71	4	10.71	8
ONEONTA	5.00	17.85	3	17.85	6
BINGHAMTON	9.00	100.00	-	32.14	3
BNGF	2.00	22.22	2	7.14	10
BNGG	7.00	77.77	1	25.00	4
CORNELL	11.00	100.00	-	39.28	2
COON	2.00	18.18	2	7.14	10
COOC	6.00	54.54	1	21.42	5
COOR	1.00	9.09	3	3.57	12
COUJ	1.00	9.09	3	3.57	12
COUW	1.00	9.09	3	3.57	12
CORTLAND	3.00	100.00	-	10.71	8
YCHM	3.00	100.00	1	10.71	8
ONEONTA	5.00	100.00	-	17.85	6
ZBMH	5.00	100.00	1	17.85	6

WITHIN 1. GR 880 FOLKLORE RELATING TO MEDICINE

INSTITUTION / HOLDING LIBRARY	NUMBER OF TITLES	PERCENT OF CLASS	RANK IN CLASS	PERCENT OVERALL	RANK OVERALL
FOUR INSTITUTIONS	2.00	100.00	-	100.00	1
CORTLAND	1.00	50.00	1	50.00	2
ONEONTA	1.00	50.00	1	50.00	2
CORTLAND	1.00	100.00	-	50.00	2
YCHM	1.00	100.00	1	50.00	2
ONEONTA	1.00	100.00	-	50.00	2
ZBMM	1.00	100.00	1	50.00	2

WITHIN 1. HM 101-108 CIVILIZATION

INSTITUTION / HOLDING LIBRARY	NUMBER OF TITLES	PERCENT OF CLASS	RANK IN CLASS	PERCENT OVERALL	RANK OVERALL
FOUR INSTITUTIONS	14.00	100.00	-	100.00	1
BINGHAMTON	8.00	57.14	1	57.14	2
CORNELL	4.00	28.57	2	28.57	4
CORTLAND	2.00	14.28	3	14.28	5
BINGHAMTON	8.00	100.00	-	57.14	2
BNGG	8.00	100.00	1	57.14	2
CORNELL	4.00	100.00	-	28.57	4
COUW	1.00	25.00	1	7.14	7
COUD	1.00	25.00	1	7.14	7
COUW	1.00	25.00	1	7.14	7
COUW	1.00	25.00	1	7.14	7
CORTLAND	2.00	100.00	-	14.28	5
YCHM	2.00	100.00	1	14.28	5

WITHIN 1. LC 189 EDUCATION AND SOCIAL PHILOSOPHY

INSTITUTION / HOLDING LIBRARY	NUMBER OF TITLES	PERCENT OF CLASS	RANK IN CLASS	PERCENT OVERALL	RANK OVERALL
FOUR INSTITUTIONS	4.00	100.00	-	100.00	1
BINGHAMTON	1.00	25.00	1	25.00	2
CORNELL	1.00	25.00	1	25.00	2
CORTLAND	1.00	25.00	1	25.00	2
ONEONTA	1.00	25.00	1	25.00	2
BINGHAMTON	1.00	100.00	-	25.00	2
BHGG	1.00	100.00	1	25.00	2
CORNELL	1.00	100.00	-	25.00	2
COON	1.00	100.00	1	25.00	2
CORTLAND	1.00	100.00	-	25.00	2
YCHM	1.00	100.00	1	25.00	2
ONEONTA	1.00	100.00	-	25.00	2
ZBHM	1.00	100.00	1	25.00	2

WITHIN 3. QH 166-2 NATURAL HISTORY: 1970-

INSTITUTION / HOLDING LIBRARY	NUMBER OF TITLES	PERCENT OF CLASS	RANK IN CLASS	PERCENT OVERALL	RANK OVERALL
FOUR INSTITUTIONS	5.00	100.00	-	100.00	1
BINGHAMTON	3.00	60.00	1	60.00	2
CORNELL	2.00	40.00	2	40.00	4
BINGHAMTON	3.00	100.00	-	60.00	2
BHGS	3.00	100.00	1	60.00	2
CORNELL	2.00	100.00	-	40.00	4
COON	2.00	100.00	1	40.00	4

WITHIN 1. 4 5111-51.9 ANTHROPOLOGY AND ETHNOLOGY. INDIVIDUAL TRIBES
 IN 21201-5000, NATIONAL BIBLIOGRAPHY

INSTITUTION / HOLDING LIBRARY	NUMBER OF TITLES	PERCENT OF CLASS	RANK IN CLASS	PERCENT OVERALL	RANK OVERALL
FOUR INSTITUTIONS	3.00	100.00	-	100.00	1
BINGHAMTON	2.00	66.66	1	66.66	2
CORNELL	1.00	33.33	2	33.33	4
BINGHAMTON	2.00	100.00	-	66.66	2
BNGG	2.00	100.00	1	66.66	2
CORNELL	1.00	100.00	-	33.33	4
CODG	1.00	100.00	1	33.33	4